Federation of St. Kitts and Nevis
Ministry of Sustainable Development

NATIONAL ACTION PROGRAMME

FOR COMBATING DESERTIFICATION

AND LAND DEGRADATION

In the Context of the United Nations Convention

To Combat Desertification

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ACRONYMS

CBD	United Nations Convention on Biological Diversity
CBO	Community Based Organisation
CDB	Caribbean Development Bank
CIC	Chamber of Industry and Commerce
DCPB	Development Control and Planning Board
DEH	Department of Environmental Health
DLS	Department of Lands and Surveys
DOA	Department of Agriculture
DOE	Department of Electricity
DPPE	Department of Physical Planning and the Environment
DPPNRE	Department of Physical Planning, Natural Resources and the Environment
GEF	Global Environment Facility
GDP	Gross Domestic Product
GM	Global Mechanism
GOSKN	Government of St. Kitts and Nevis
MEA	Multi-lateral Environmental Agreement
MOF	Ministry of Finance
MTES	Medium Term Economic Strategy Paper
NAP	National Action Plan
NCEPA	National Conservation and Environmental Protection Act
NEMA	National Emergency Management Agency
NEMS	National Environmental Management Strategy and Action Plan
NGO	Non-governmental Organisation
NIA	Nevis Island Administration
NPDP	National Physical Development Plan
PWD	Public Works Department
SKN	St Kitts and Nevis
SKNIS	St. Kitts National Information Service
SLM	Sustainable Land Management
SSMC	St Kitts Sugar Manufacturing Company
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
WSD	Water Services Department
XCD	Eastern Caribbean Dollar

EXECUTIVE SUMMARY

The *National Action Programme for Combating Desertification and Land Degradation in St. Kitts and Nevis (NAP)* is a comprehensive and integrated framework for addressing the physical, biological and socio-economic aspects of the process of land degradation. Accordingly, the NAP integrates strategies for poverty reduction, sustainable land management, institutional collaboration and cooperation, and the creative sourcing of funds for combating land degradation at the national and community levels.

The Federation of St. Kitts and Nevis is obligated, under the United Nations Convention to Combat Desertification to which it acceded to September 28th 1997, to prepare a NAP. This NAP is therefore compliant with Articles 9 and 10, and the general obligations of the Convention as outlined in Article 4. Additionally, the NAP is consistent with Article 5 and:

- Establishes strategies and priorities within the framework of sustainable development plans and policies to combat land degradation;
- Addresses the underlying causes of land degradation and paying particular attention to socio-economic factors contributing to the process;
- Promotes national and local awareness and facilitates the participation of local populations and non-governmental groups in programmes to reduce land degradation; and,
- Creates an enabling environment by strengthening laws and institutions and establishing long-term policies and programmes geared towards the reduction, prevention and mitigation of the impacts of land degradation.

The NAP calls for the implementation of the following actions:

- Establishment of a public awareness and education programme;
- Increasing participation of NGOs, CBOs and the private sector;
- Reintroduction of community-based land-related environmental competitions;
- Promotion of a policy for sustainable land management (SLM) which will guide socio-economic development as well as the reduction and prevention of land degradation in St. Kitts and Nevis;
- Rehabilitate degraded land resources;
- Adoption and implementation of the 2006 National Physical Development Plan (NPDP).
- Preparation of a Coastal Zone Management Plan.
- Finalisation and adoption of a Land Use Code which establishes a watershed planning and management framework, improvement in building practices, and establishment of minimum standards for the development and growth of communities.
- Regulation and reduction of the illegal occupation of land including regularisation of squatter residential communities, establishment of a squatter relocation programme, regularisation of squatter agricultural lands, formulation of a policy on squatting, and implementation of a public education campaign.

- Preparation of a sustainable management plan for quarry resources on St. Kitts and Nevis.
- Preparation of a sustainable water resources management plan including enactment of a new Water Resources Management Act, integrated management of the country's water resources, a national agricultural irrigation strategy, adoption and implementation of water pollution rules, establishment of regulations protecting surface and ground waters and licensing procedures for desalination plants.
- Development of an early warning system for predicting droughts, floods, and volcanic activities.
- Rationalization of the roles and responsibilities of institutions involved in land management.
- Revision and rationalization of the existing legal framework to ensure sustainable management and wise use of the country's land resources.
- Establishment of a unified real estate registration system through the creation of a sound land registration and cadastre system.

The following methodologies and strategies are recommended for implementation of the NAP:

1. **Appointment of a Steering Committee:** The National Capacity Self Assessment (NCSA) Project Committee will serve as the Steering Committee (SC). Its primary functions will include the formulation of goals and objectives, providing policy guidance, and serving as the coordinating authority to ensure and guide the participation of government sectoral representatives and NGOs.

2. **Community participation**: Community involvement and coordination with various stakeholder groups through community consultations and workshops.

Funding for the NAP will, for the most part, be derived from grants provided to St. Kitts and Nevis as a party to the UNCCD by the Global Environment Facility (GEF) and the Global Mechanism (GM) as well as the annual budget of participating government agencies, and private sector contributions, as follows:

a) Funding mechanism by the GEF and GM as the UNCCD is related to other conventions such as the CBD and UNFCCC;
b) Establishment of a transparent private sector "Green Fund" toward wider environmental protection; and,
c) Allocations within the national budget for NAP implementation.

PART ONE: INTRODUCTION

1.0 SIGNATURE AND RATIFICATION OF THE UNCCD

In any small island Caribbean setting, land degradation is fundamentally a result of the depletion, removal and loss of biodiversity from the impact of human activity and natural disasters together with fire, deforestation, road maintenance, crop farming and animal husbandry practices, quarrying, human settlement patterns and physical geography and climatic changes, particularly drought.

On June 30th 1997, the Federation of St. Kitts and Nevis signed the United Nations Convention to Combat Desertification (UNCCD). The UNCCD came into force for St. Kitts and Nevis on September 28th 1997. The reasons for St. Kitts and Nevis becoming signatory to the UNCCD were as follows:

a) To support other Caribbean countries experiencing the effects of severe drought and land degradation;
b) To participate in the development of technologies and adaptation strategies to address land degradation and mitigate against the impacts of land degradation and drought;
c) To increase global awareness of the threat which land degradation and drought poses to Small Island Developing States (SIDS);
d) To access funding to assist with efforts at the community and national levels to address land degradation and drought; and,
e) To increase public awareness of the problems of land degradation and drought.

This NAP is the final output of a collaborative process involving government agencies, the private sector, NGOs, community groups and individuals interested in combating land degradation. The lead agency on the island of St. Kitts was the Ministry of Sustainable Development. On the island of Nevis, the Ministry of Communications and Works, Physical Planning, Natural Resources and Environment took on the primary responsibility for the preparation of the NAP.

Essentially, the NAP seeks to:

a) reduce current and potential land degradation particularly in the area of loss of agricultural productivity, soil and coastal erosion and solid waste management;
b) reduce the adverse environmental effects of current and future economic development;
c) educate and raise awareness on current and potential land degradation issues, particularly with respect to the closure of the sugar industry on St. Kitts;
d) ensure adherence to international environmental conventions to which St. Kitts and Nevis is signatory.
e) research and promote the available environmentally friendly alternate technologies in critical sectors including agriculture, transportation, energy and water; and,
f) protect and conserve threatened biodiversity resources.

2.0 CONTEXT

2.1 Location

The twin island Federation of St. Kitts and Nevis consists of two islands located in the northern part of the Lesser Antilles chain of islands in the Eastern Caribbean. St. Kitts is located at latitude 17^0 15' north and longitude $62^0$45' west and Nevis is located two miles (3 km) to the south-east, at 17^0 10' north and longitude $62^0$35' west.

The Federation of St. Kitts and Nevis has a land area of 269 sq. km. (104 sq. miles). The larger of the two islands, St. Kitts is 176 sq. km. (68 sq. mi.) in area. It is approximately 36.8 km (23 mi) long and is roughly oval in shape with a narrow neck of land extending like a handle from the southeastern end. Nevis has an area of 93 sq. km. (36 sq. mi), with a length of 12.3 km (7.64 mi) and a width of 9.6 km (5.96 mi) at its widest point.

Fig. 1: Map of Caribbean showing location of St. Kitts and Nevis

Source: First St. Kitts and Nevis Digital Data Atlas (2002)

2.2 Climate

The climate of St. Kitts and Nevis is classified as tropical marine. Generally, it is influenced by steady northeast trade winds and tropical oceanic cyclonic movements. Furthermore, the island enjoys warm even temperatures with a mean of approximately 27^0C. Seasonal and diurnal variations in temperature are small (*see Figure 2*). The average temperature at Basseterre is 27.8^0C (79.6^0F). Only at higher elevations do temperatures drop below 17^0C (60^0F).

Rainfall is mainly orographic and increases in amount and frequency with altitude. The uplift effect of the central mountain range produces an annual average of 64 inches (1,625 mm). Mean annual rainfall ranges from about 40 inches in the coastal areas, to about 150 inches in the central mountain ranges. The situation at the SEP is quite different, with mean annual precipitation varying from 39 inches on the peaks to 34 inches at Cockleshell Bay. Generally, rainfall is unevenly distributed between years and between months with a reliable wet period from August to September and driest months January - April (*see Figure 3*).

The relative humidity level is usually low in the dry season and high in the wet season. The mean value is 76 percent but ranges from 70 percent in March to 78 percent in September, October and November. The island receives an average of nine hours of sunshine per day. The prevailing winds hold fairly steady from the east, swinging seasonally between Northeast and Southeast with mean speeds ranging from 5.4 mph in November to 9.1 mph in July. Higher-than-normal-wind speeds are experienced during the dry months of January and March. The periods of seasonal low pressure between July and September have higher wind speeds of 20-30 mph. The hurricane season extends from June to November, and there is a high annual frequency of tropical disturbances that generate squalls and high wind velocities.

Cloud cover is more common than would be expected, averaging between 40 and 50 percent, which helps account for the relatively low evapo-transpiration rate of around 40 inches per year. Free water evaporation rates are about 5 inches per month or 60 inches per year, which explains the general absence of open water impoundments and the preference for tanks and cisterns for water storage.

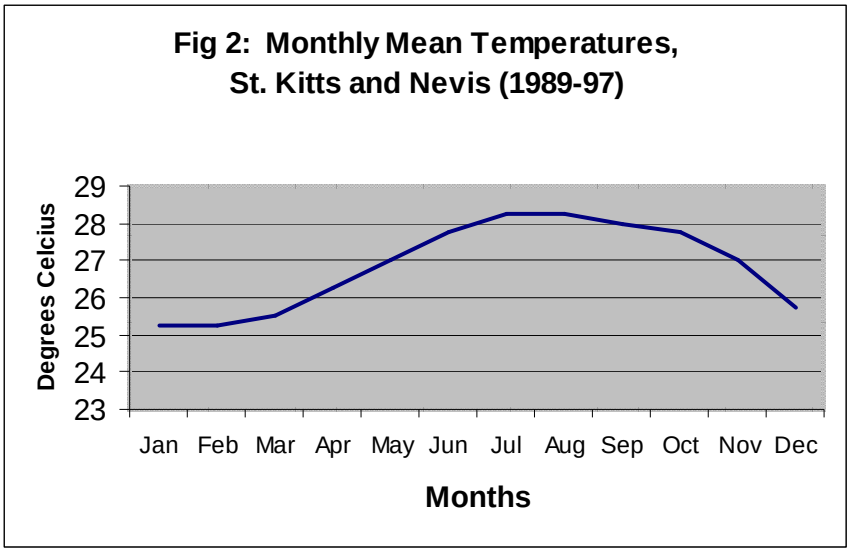


Fig 2: Monthly Mean Temperatures,
St. Kitts and Nevis (1989-97)
Degrees Celcius
29
28
27
26
25
24
23
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Months

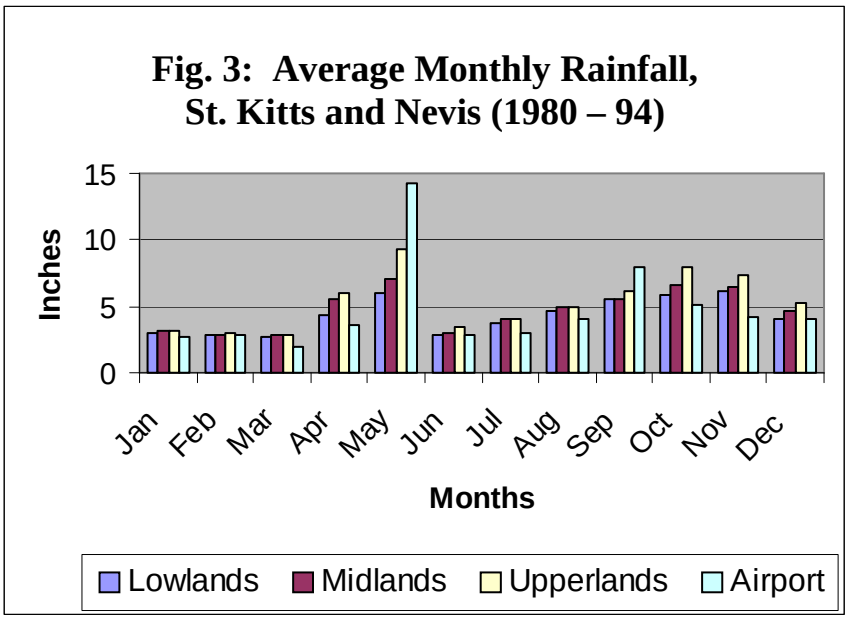
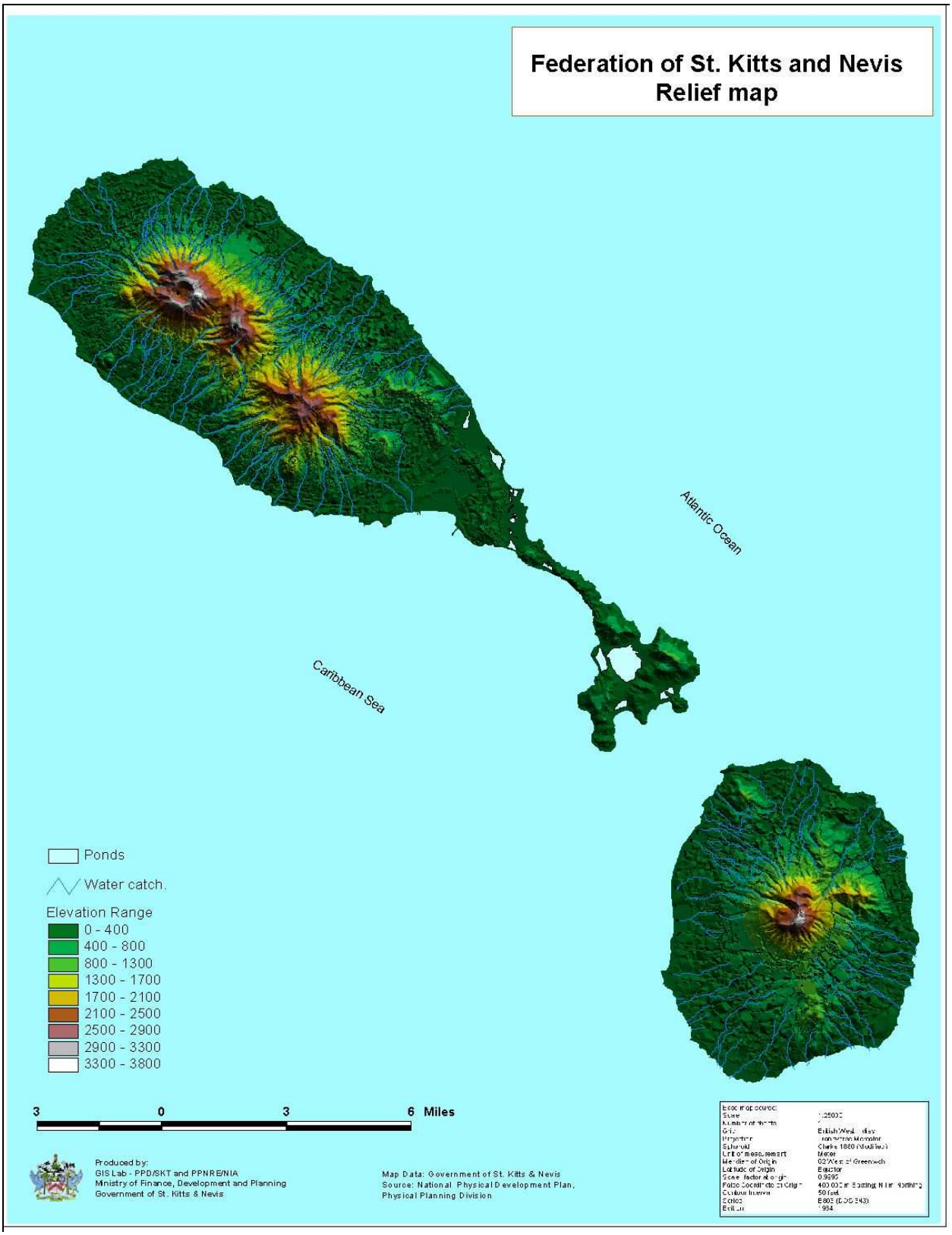


Fig. 3: Average Monthly Rainfall,
St. Kitts and Nevis (1980 – 94)
Inches
15
10
5
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Months
Lowlands Midlands Upperlands Airport


Federation of St. Kitts and Nevis
Relief map
Atlantic Ocean
Caribbean Sea
Ponds
Water catch.
Elevation Range
0 - 400
400 - 800
800 - 1300
1300 - 1700
1700 - 2100
2100 - 2500
2500 - 2900
2900 - 3300
3300 - 3800
3 0 3 6 Miles
Produced by:
GIS Lab - PPD/SKT and PPNRE/NIA
Ministry of Finance, Development and Planning
Government of St. Kitts & Nevis
Map Data: Government of St. Kitts & Nevis
Source: National Physical Development Plan,
Physical Planning Division

2.3 St. Kitts physical landscape

The physical landscape of St. Kitts is characterised by three volcanic centres: 1) the central northwest range, dominated by Mt. Liamuiga, which rises with a pronounced crater to 1,156 meters (3,792 ft). It is the Federation's highest peak; 2) the middle range, which consists of a number of irregular related peaks dominated by Vrechild's mountain at a height of 975 meters (3,200 ft). The slopes in this range are steeper and shorter towards the leeward coast; and 3) the southeast range, which consists of a number of irregular peaks, with the highest being 900 meters (2,953 feet) above mean sea level. Like the middle range, the slopes here are steeper and shorter on the leeward side.

Most flat or moderately sloped land occurs near the coast, and as a result, most urban and agricultural developments have occurred there. The island's coastline largely consists of cliffs, some 15 – 30 meters (50 to 100 feet) high. Beaches at the foot of these cliffs are narrow and the sand is coarse and black, with many pebbles and boulders. Exceptions are in the northwest, where the cliffs are lower and some beaches have yellow sand and are wider. In Basseterre where there are cliffs, there is a narrow beach of grey sand. From Conaree, on to the southeast of the island, there are long stretches of fine yellow sand beaches.

2.4 Nevis physical landscape

Topographically, Nevis is approximately circular and dominated by the central Nevis Peak, 985 m (3,232 ft.) high. Windy Hill (309m) and Saddle Hill (381m) at the head and tail of the island, respectively, align with Nevis Peak to form a north-northwest/south-south-east trending spine comparable to the more pronounced spine of St. Kitts. To the east, the spine is thickened by the bulge of Butlers Mountain (478m). Slopes vary from almost zero near the sea, to over 40 percent in the vicinity of Saddle Hill, Butlers Mountain, Nevis Peak and Windy Hill.

2.5 Forest resources of St. Kitts and Nevis

While some Caribbean countries such as Dominica have undisturbed and extensive forests, the present vegetation of St. Kitts and Nevis provides evidence of great disturbance by human activity. In the lowland areas, intensive land use has removed all vestiges of the natural vegetation. Although the mountain peaks are still covered by forest, they do not have virgin forest characteristics. Lower slopes are covered by secondary growth on abandoned farms. The resident vegetation comprises about 243 species of trees (*Beard, 1946*).

Beard (1946) describes five forest type remnants of the original vegetative cover:

- Rain forest: These areas are dominated by palms with large Gommier trees (*Dacryodes excelsa)* and "Burrwood" (*Solanea spp).* There are only two small areas of first class undamaged rainforest -- one at the headwaters of the Wingfield River and the other above Mansion Estate comprising 600 - 700 acres (*see Plate 2*).

- Dry evergreen forest: These are secondary forest occupying the lower margins of the forest, usually on lands thrown out of cultivation. This group includes the useful

"Sweetwood" (*Lauraceae spp.)* and "Small-leaf" (*Myrtaceae spp.)* families. The undergrowth consists of densely growing shrubs and vines such as *Piper spp*. Twenty one species were enumerated by Beard and included many intolerant pioneer species.

- Palm brake: This forest covers land between an elevation of 1200 and 1800 feet. The forest consists mainly of the mountain cabbage palm (*Euterpe globosa) (60%),* with a few tree-ferns (15%) and small trees (25%).

- Elfin woodland: This vegetation type appears on peaks and ridges above 2000 feet. This is a low, tangled and windswept growth, loaded with epiphytes, mosses and lianas.

- Dry scrub woodland: Mostly located on the Southeast Peninsula (*see Plate 3*). Beard suggests this area was probably once forested with deciduous seasonal forest, but now supports a 39-specie xerophytic scrub dominated by acacia and agave as well as Columnar and Turk's Head cacti.

More recently in January 2003, Eileen Helmer and Fito Marcano of the USDA Forest Service visited eight sites on the island of St. Kitts and listed common species encountered during field reconnaissance (*see Table 1.3*).

2.6 Wildlife resources of St. Kitts and Nevis

Bats are the only native terrestrial mammals to be found in the country today. Morton and Courts (1999, unpublished data) found five species of bats in St. Kitts. These include the pig-faced bat *(Brachyphylla cavernarum*), the common fruit bat (*Artibeus jamaincencis*), the fishing bat (*Noctilio leporinus*), the Lesser Antillean tree bat (*Ardops nicholisi*) and the Velvety House Bat (*Molossus molossus*).

Mammalian introductions include:

- Agouti (*Dasyprocta agouti*) believed to be an Amerindian introduction;
- African green vervet monkey (*Cercopithecus aethiops*) introduced as pets to the island in the 17th century by French settlers. Population estimates vary widely. Sade and Hildric (1965) estimated 1,2000, Poirer (1972) estimated 5,600 – 8,400. The University of Mc Gill indicated a population of over 30,000 animals in 1974. Presently, the Department of Forestry estimates a population of 35,000 - 40,000 animals.
- White-tailed deer (*Odocoileus virginianus*) was introduced to the Lodge Estate as pets in the 19th century. They originated from the Florida Keys. When the herd reached seven animals they were released to the Frigate Bay area. The animals never gained any significant population status and their numbers remained small due to indiscriminate hunting by people and wild dogs. Presently, they are either extinct or restricted to the Canada Hills and the xerophytic scrub lands of the SEP. The NCEPA (1987) list the deer as a protected species.
- Indian mongoose (*Herpestes javanicus*) was introduced to the island as a predator for the control of field rats and snakes. The animal is presently considered as a pest to wild birds and domestic poultry and is trapped to reduce its pest status.

Table 1: Common vegetation species encountered in selected areas visited on St. Kitts

1. Volcano Trail: (< 1,100 ft.) Seasonal Evergreen Forest (moist) *Mangifera indicata* *Clusia rosea* *Piper dilatarum* *Faramea occidentalis* *Myrcia splendens* *Beilschmiedia pendula*	**2. Volcano Trail: (> 1,100 ft.) Evergreen Forest (wet)** *Slonea massoni* *Faramea occidentalis* *Dacryodes excelsa* *Beilschmiedia pendula* *Cyathea arborea* *Cinnamomum elongatum*
3. Volcano Trail: (2,700 to 2,750 ft.) Evergreen Forest – Palm Cloud Forest (lower montane wet) *Prestoea Montana* *Dacryodes excelsa* *Sloanea massoni* *Cyathea arborea* *Miconia mirabilis* *Podocarpus coriaceus*	**4. Volcano Trail: (> 2,800 ft.) Evergreen Forest – Elfin Cloud Forest (lower montane wet)** *Podocarpus coriaceus* *Hedyosmum arborescens* *Weinmannia pinnata* *Ilex sideroxyloides* *Miconia mirabilis*
5. Frankland's Estate: (< 500 ft.) Semideciduous Woodland/Shrubland (dry) *Leucaena leucocephala* *Gliricidia sepium* *Croton flavens* *Acacia farnesiana* *Citharexylum spinosum* *Bursera simaruba*	**6. Des D'ane Pond Trail: (1,700 t0 2,000 ft.) Evergreen Forest – Tall and Elfin Cloud Forest (lower montane wet)** *Podocarpus coriaceus* *Micropholis chrysophylloides* *Freziera undulate* *Hedyosmum arborescens* *Palicourea crocea* *Miconia mirabilis*
7. Above Frankland's Estat (500 – 700 ft.) Semideciduous Forest (dry or moist) *Tabebuia heterophylla* *Bursera simaruba* *Cordia sulcata* *Hura crepitans* *Randia aculeata* *Canella winterana* *Zanthoxylum martinicense* *Coccoloba uvifera* *Daphnopsis caribaea* *Tecoma stans* *Coccoloba diversifolia* *Guazuma ulmifolia*	**8. Sir Timothy's Hill & Salt Pond Estate: Semideciduous Forest with succulents (dry)** *Acacia farnesiana* *Bursera simaruba* *Croton flavens* *Calotropsi procera* *Plumeria alba* *Cephalocereus royenii* *Erithalis fruticosa* *Cordia obliqua* *Conocarpus erectus* *Ardisia obovata* *Randia aculeate* *Coccoloba uvifera*

Source: Helmer, E., 2003

2.7 Resident and native birds in St. Kitts and Nevis

Local bird enthusiasts have reported the presence of over 130 species (including migrants) on the island. Research over the past decades have established that the number of bird species is less than 100 (Danforth, 1936; Morris and Lemon, 1984; and, Hilden, 1989). Steadman et. al. (1997) increased the number of bird species on the island of St. Kitts to 116. It is estimated that about one third of these species are migratory (Morris and Lemon, 1982). Typical birds found at the forest mountain ranges and the surrounding areas are the scaly-breasted thrasher (*Margarops fuscus*), pearly-eyed thrasher (*Margaros fuscatus*), zenaida dove (*Zenaida aurita*), brown trembler (*Cinclocerthia ruficauda*) purple throated carib (*Eulampis jugularis*), antillean crested hummingbird (*Orthorhynchus cristatus*), bananaquit (*Coereba flaveola*), rusty-tailed flycatcher (*Myiarchus tyrannulus*), red-necked pigeon (*Columba squamosa*), and red-tailed hawk (*Buteo jamaicensis*) (Danforth, 1936; Ricklefs and Cox, 1977; Morris and Lemon, 1982). Recent sightings on St. Kitts include the Blue Grosbeak and the House Sparrow.

Norton (1989) concluded that the pond systems of St. Kitts are extremely important to shorebirds. He counted 25 species of 2,300 shorebirds in one day. Shorebirds are particularly concentrated at Half Moon Pond, Little Salt Pond, Friars Bay Pond, and Majors Bay Pond. Many of these shorebirds are winter residents or birds arriving in July/August and remaining until April/May before leaving for breeding grounds further north and include the great blue heron (*Ardea herodius*) and the western sandpiper (*Calidris mauri*). Three local nesting shorebirds have been documented for St. Kitts – black necked stilt (*Himantopus mexicanus*), wilson's plover (*Charadrius wilsonia*) and snowy plover (*Charadrius alexandrinus*). Another group of water birds (ducks and coots) use Mosquito Bay, Friars Bay and the eastern shore of Great Salt Pond as wintering habitats. These include American coots (*Fulica Americana*), Caribbean coots (*Fulica caribaea*), and the blue-winged teal (*Anors discors*).

The following eight species of seabirds are known to nest on the island of St. Kitts: brown pelican (*Pelecanus occidentalis*), magnificent frigate bird (*Fregata magnificens*), least tern (*Sterna albifrons*), sooty tern (*Sterna fuscuta*), bridled tern (*Sterna anaethetus*), laughing gull (*Larus atricilla*), brown noddy (*Anous stolidus*) and roseate tern (*Sterna dougallii*). The most important seabird nesting sites for St. Kitts are Booby Island and the area between Green Point and Nags Head on the South-east Peninsula.

2.8 Coastal and marine resources of St. Kitts

The coastal and marine ecosystems in St. Kitts include coral reefs, sea grass beds, mangroves, salt ponds, diverse aquatic life and the coastline. As an island territory, St. Kitts has a fragile 78.1 km long coastline consisting of 34.7 km cliff (rocks), 10.8 km cobble, 6.3 km boulders and rocks, 13.1 km black volcanic sand, and 13.2 km golden sand.

Mangroves are not abundant, the main and most extensive mangrove habitat in St. Kitts occurs in the South East Peninsula. Hawksbill and green sea turtles are found around the entire coast. In addition, there is a large number of resident and migratory birds that depend on the mangrove and pond communities for feeding and nesting.

Coral reefs and sea grass habitats are generally found along the southwest coast between Nag's Head and the southern end of Basseterre Bay, on the northwest coast between Sandy Point and Dieppe Bay, on the east coast between Conaree and Friar's Bay and on the southeast coast adjacent to the Narrows (*see Plate 7*). Most coral habitats are relatively small with less species diversity than is typical of similar habitats in the Eastern Caribbean. Deep reefs with species diversity are found off Sandy Point and Guana Point, and in the Narrows. Sea grass beds, dominated by turtle grass and manatee grass species are mostly common in the SEP of the island.

Both coral reef and sea grass communities contribute to the following environmental processes:

- Provide habitat for commercially important fish species, spiny lobster and queen conch;
- Produce nutrients which are important in sustaining the life of fish species and other organisms;
- Act as barriers during periods of heavy wave attack; and,
- Contribute to the development of white sand beaches – an important tourism asset.

The main and most extensive mangrove habitat in St. Kitts occurs in the SEP area. Hawksbill and green sea turtles are found around the entire coast. In addition, there is a large number of resident and migratory birds that depend on the mangrove and pond communities for feeding and nesting.

2.9 Coastal and marine resources of Nevis

Shoreline features of Nevis include sandy beaches, fresh water lagoons, rocky shores and massive sea cliffs. The most prominent sandy beach is a 4 km section of the coastline that stretches north from Charlestown to Cades Bay, called Pinneys Beach. It is composed of both coral fragments and terrestrial soils that give it a yellow appearance and is typical of a number of beaches found along the leeward coast of the island. Another feature associated with the leeward coastline of Nevis is its system of freshwater lagoons. These may be the result of either mountain ghaut run-off, as is the case for the Pinneys Estate lagoons, or underground springs as evidenced at Nelson Springs in Cotton Ground.

Rocky shores are often associated with an impressive array of marine life from algae and snails to juvenile fishes of all description. Sea cliffs are found where strong wave energy undercuts rocky ledges and erodes soil from agglomerate and unconsolidated rock. These rugged habitats can be found on the southern and eastern coasts of Nevis. Three coastal habitats, freshwater lagoons, coral reefs, and seagrass beds, are of critical importance to the nearshore tropical marine ecosystems of Nevis. There are many direct and indirect links between the productivity of these habitats and the health of inshore fisheries.

2.10 Socio-economic context

2.10.1 Economic development

The Caribbean Development Bank Annual Economic Review (2004), reported that the economic performance in St Kitts and Nevis improved in 2004, with real economic growth estimated at 4%

compared with 0.4% in 2003. Positive sectoral growth was recorded in tourism, construction, manufacturing, agriculture, transport and communication. The economic rebound in 2004 was driven mainly by the rapid expansion of tourism and related services. The tourism sector activity increased with strong growth in both stay-over visitors and cruise ship arrivals. The construction sector recorded positive growth in 2004, following declines in 2003 and 2002. The manufacturing sector also registered positive growth despite a significant decline in sugar production during the year. The agricultural sector grew in 2004 despite being affected by adverse weather conditions. Inflation remained low averaging 2.3% in 2004 compared with 2.2% in the previous year. Fiscal performance strengthened further in 2004 on account of strong revenue performance and restraint on the capital expenditure programme. Administrative improvements at both the Customs and Inland Revenue Departments, together with increased economic activity resulted in higher revenue collections in 2004. However, current expenditures rose sharply due to salary and wage increases, higher expenditures on goods and services and an increase in interest costs. Fiscal improvement in SKN amounted to 0.6% of GDP in 2004 complementing the fiscal adjustment of 8.4% of GDP in 2003.

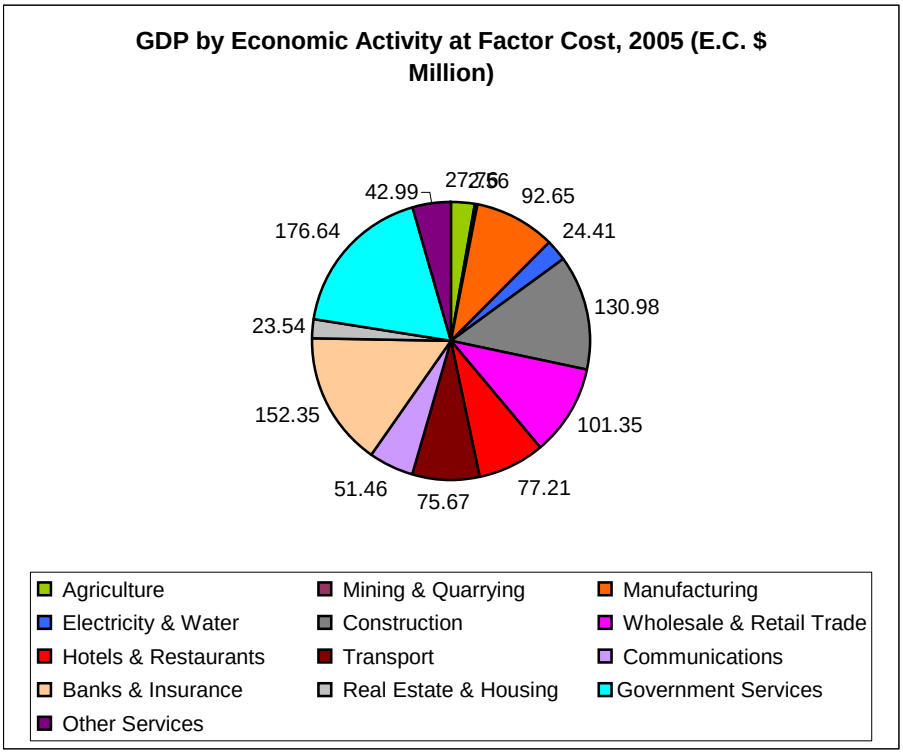


Figure 5: GDP by Economic Activity at Factor Cost, 2005 (E.C. $ Million)
(Source: Statistics Office, Ministry of Sustainable Development, 2005)

The CDB Annual Economic Review 2004 further reported that there was improved fiscal management through the strengthening of tax administration resulted in higher revenue collections. In addition, restraint in expenditures, particular capital expenditure, contributed to the overall fiscal improvement in 2004. The current account deficit was estimated at XCD10.7 million (1% of GDP) in 2004, compared with XCD11.8 million (1.2% of GDP) in 2003.

However, the improvement in the current revenue was almost overshadowed by significant increases in current expenditure, notably, wages and salaries, goods and services and interest expenditures, resulting in the marginal reduction in the current deficit. Moreover, the marginal rise in capital expenditure and net lending was less than the increase in the capital revenue and grants thereby resulting in an overall deficit of XCD80.1 million (7.4% GDP) in 2004 compared with XCD 79.9 million (8% of GDP) in 2003. Capital expenditure rose by 2.2% to XCD78.1 million in 2004, compared with XCD76.4 million in 2003. However, despite the fiscal improvement in 2004, the overall fiscal imbalance continues to be unsustainable, contributing to the growing debt difficulties of the Government. Current revenue growth of 16.7% to XCD365.3 million in 2004 was attributed to the continuing efforts at improving administrative efficiency in tax administration.

Sugar was the traditional mainstay of the St. Kitts economy until the 1970s. The combination of improved international connections at the airport and cruise dock, and attractions such as the 470-room Marriot resort (opened in February 2003 in Frigate Bay), Brimstone Fort, and the Scenic Railway around the island are helping to boost St. Kitts tourism revenue to the extent that they are now the chief source of the islands' foreign exchange. Stay over visitors increased 32.6% while cruise passenger arrivals increased 78% in 2004. The government has continued with tourism as the major thrust of its economic activity with projects valued over US $700 million in the Southeast Peninsula, Frigate Bay and Whitegate areas (Prime Minister, 2005).

The construction industry, for example, has boomed at periods such as when the new hotel complex was being built, tourism has shown fluctuations due to hurricanes, international events and economies, and the agricultural industry has been in steady decline.

The last crop for sugar production was in July 2005 and the Federal Government has tentatively set out a transition strategy for the SSMC. The elements of the strategy include (i) utilising sugar cane in various economic processes, including energy production (co-generation of electricity), ethanol production, rum production and livestock feed; (ii) promotion of non-sugar agricultural diversification (increasing food production); (iii) strengthening of agricultural/tourism linkages; and (iv) development of heritages sites and cultural programmes. There are a number of issues to be addressed in the transition programme including (i) the timing and period of the transition; (ii) the selection of the transition team with the relevant expertise for effecting the smooth transition out of sugar production; (iii) the institutional arrangements for the transition process; (iv) the cost of the transition including SSMC's debt, severance payments to sugar industry workers; (v) the funding of the cost of several technical studies to be undertaken to arrive at a decision for the future option of the industry; (vi) land use policy and environment concerns with the closure of the sugar industry; (vii) training and employment creation for workers, who are likely to be displaced with the transition of the sugar industry, and (viii) soliciting assistance (financial and otherwise) for the transitioning of the sugar industry (CDB, 2005).

2.10.2 Poverty Assessment

The Poverty Assessment Report (2001) reported that 30.5%, or a little less than 1 in 3 individuals in St. Kitts are poor. This suggests that their monthly expenditure is less than the cost of meeting their minimal food and other basic requirements – the poverty line was estimated at EC $280.05

(US$103.72) per month for an individual. Eleven (11) percent, or slightly more than 1 in 10 individuals in the country, were found to be extremely poor or indigent - the indigence line was EC $177.94 (US$65.90) per month. More than two-thirds of the poor (67.8%) are under 25 years of age. Males were 44 percent of the poor and women 56 percent. Twenty-nine percent of males were poor and 32 percent of women are poor.

Similarly in Nevis, 32% or a little less than 1 in 3 individuals are poor. This suggests that their monthly expenditure is less than the cost of meeting minimal food and other basic requirements or less than E.C. $328.40 (US$121.63). Seventeen percent of all individual are extremely poor or indigent, and do not have the E.C. $204.40 (US$75.70) necessary to meet their dietary needs. Fifty-eight percent of the poor are under the age of 25. Males make up 37 percent of the poor and females 63 percent. Twenty-six percent of males are poor and females account for 36 percent of the poor.

2.11 Agricultural production systems

Current GOSKN policy is to significantly increase agriculture production in a competitive and sustainable manner through the development of farmers. Accordingly, special emphasis will be placed on the commercialization of farmers in an attempt to transform the sector into one that is internationally competitive. The general objective of the crops programme is to facilitate commercial production of crops to ensure food security, foreign exchange savings and sustainable development. As part of the operational strategy the programme has been divided into two sub-programmes with one each for food crop as well as fruit and tree crops. The general objective of the livestock programme is to increase production and market locally produced meat products thereby increasing the contribution of the sub-sector to national development. In order to achieve this objective, the programme has been divided into three sub-programmes with one each for large ruminants (beef), small ruminants (mutton) and pork production.

2.11.1 Crop production

Crop production continues to be mainly rain-fed resulting in surplus vegetable production during the first four to five months of the year and shortages for the remaining months. Monkeys have remained a major pest while increasing crop damage caused by stray/roaming animals has become a major problem for crop farmers. Limited access to land for some crops including peanut, white potato and fruit trees appears to have restricted their development despite significant domestic market opportunities.

Vegetable cultivation

Vegetables, root and tubers are grown on holdings that are up to 8 hectares in size. Crop farming is dominated by small farmers with average holdings of less than 1.0 hectare and a few larger farms of holdings that are greater than 5.0 hectares. The crops cultivated include pumpkin, carrot, watermelon, cucumber, tomato, sweet pepper, string beans, onion, white potato, sweet potato, dasheen and yam. Vegetables tend to be grown in the higher elevation while peanuts are grown at the lower altitude. Significant amount of sweet potatoes is grown in fallow with

sugarcane by workers of SSMC. The domestic annual demand for these crops ranges from 550,000 kg for white potato to 45,000 kg for sweet pepper. Local production of the major vegetables have fluctuated over the 5 year period 1999 to 2003 with annual average production ranging from 142,000 kg for white potato to 15,000 kg for pineapple. However, a large amount of food is imported into the country on a regular basis. The value of vegetables and fruits imported on an annual basis is over EC$14M.

Fruit and tree crops

St. Kitts is not traditionally a commercial fruit-tree producing country. Nevertheless, the soils, climate and topography make this island very attractive for tree crop cultivation and production. Indeed, there is much evidence that several kinds of tree crops do extremely well within the local environment. Accordingly, tree crop cultivation is not only a high potential commercial venture but an environmental necessity if the rate of land degradation is to be reduced and aquifer-recharge enhanced. The development of orchards to enable substitution of imported fruits and fruit juices would take time, but encouragement should be given to introducing tourists to local fresh fruits and juices to stimulate interest and improve the prospects for local processing of a range of such juices.

The landscape of St. Kitts is characterized by a range of fruit trees found in the foothills of mountains, along ghauts and the sides of mountain paths. Traditionally fruits have been consumed seasonally by Kittitians but now there is a strong demand on a continuous basis as persons become more health conscious. There is also a very strong demand in the hospitality sector and opportunities exist for the export market.

In terms of established orchards, there is one main mango, citrus and avocado orchard in Wingfield Mountain. Along with this 13 hectare orchard there also exists two smaller mango orchards in Molineaux and Parsons that are managed by individual farmers. Farmers are now planting more of the minor exotics namely carambola, hybrid guava, Indian Jujube and wax apple with a small emphasis on the traditional fruits. There has been renewed emphasis on the production of pineapples and a farmers' association was recently formed with the aim being to ensure production on a year round basis.

2.11.2 Livestock farming

The livestock sub-sector has been facing several challenges including an absence of commercial farmers; low management and husbandry skills of livestock farmers and insufficient lands allocated to livestock development. However, significant opportunities exist to expand local production for further penetration of the domestic market. The main objective would be to further expand the market share for beef, mutton and pork meat by developing a core group of full-time commercial farmers.

Production in the livestock sub-sector during the period 1999 to 2003 has shown significant increases for beef, goat and pork meat while a marginal decline has been recorded for mutton. The annual production of beef increased by 135% from 35,400 kg in 1999 to 83,200 kg in 2003 while the production of pork increased by 78% from 37,500 to 66,600 kg during the same period.

Production of mutton declined marginally from 12,700 to 11,900 kg. During the said period, livestock products continued to be imported in very high volumes and the total value of imported meat and meat preparations in 2003 was EC$15.5M. During 2003 an estimated 48% of the beef consumed was imported while the importation was 63% for mutton and 83% for pork. There still exists a large gap between imported meats and locally produced meats with the exception of beef. The data shows that in the years 2002 and 2003 local beef production exceeded importation. However, the challenge still exists to substitute large quantities of imported meats and to sustain the improved level of beef production.

Beef production

During 2003, the estimated cattle population in St. Kitts was 3,921 heads and raised on an estimated 3,921 acres of land (2000 Preliminary Results of the Agricultural Census). If an effort is made to produce the total amount of beef consumed in 2003 (201,100 kg)**,** then 1,256 heads of cattle from a herd size of 3,000 breeding cows would need to be slaughtered. In order to maintain a herd of this size 6,384 acres of good forage land would be required.

Cattle production is dominated by part-time farmers who generally raise a few animals on unimproved pastures. There are a few medium sized farms (50 to 100 heads) and one relatively large farm that is operating in an open range system on the South-east Peninsula. The total number of cattle slaughtered annually has increased from 386 in 1999 to 657 in 2003 and beef production increased from 60,700 to 104,600 kg during the same period. The current level of production cannot be maintained under the present farming system and there is a need to develop commercial farms.

Mutton production *(sheep and goat meat*)

An opportunity exists to increase mutton production to 60% of the amount imported in 2003 (105,000kg) which is 63,000 kg. Small ruminant farming is mainly undertaken by part-time farmers who raise less than 100 heads of animals. A significant characteristic of these farmers/livestock owners is their reluctance to sell except on special occasions. There is only one large small ruminant farm and it is operated as an open range system on the South-east Peninsular. Significant increases in production would require the development of commercial farms that are financially viable and are demand driven.

Pork production

Pork production has increased annually in St. Kitts from 27,000 kg in 2000 to 66,600 kg in 2003. It is important to note that the increased pork produced is mainly sold in the fresh market and that there is minimal penetration of supermarkets. Interestingly the data shows that although local production of pork has been on the increase imports have also been increasing. There has been an increasing demand for pork products and this has generated a strong interest in pig production. In 2003, the total amount of pork consumed was estimated at 453,600 kg of which 375,800 kg or 83% was imported.

2.11.3 Lands required for future agricultural activity

The issue of land use policy, production zoning and the utilization of idle lands has become even more crucial in determining the future direction and development of the agricultural sector. In this regard, the Departments of Agriculture (DOA) and Physical Planning and Environment (DPPE) are currently collaborating on the finalisation of an agriculture land use map, primarily based on the goals and objectives of the Strategic Plan (2005 – 2009) but also utilising land suitability and capability criteria. The suitability of remaining sugar land for potential agricultural land uses was determined by studying a number of land quality and characteristic factors including land capability, soil type and fertility, elevation, slope zone analysis, annual precipitation, and proximity to water for irrigation.

Table 2: Proposed agricultural land uses

Agricultural Usage/Activity		**Acres**	**Totals**
Sugar cane*		6,043.85	**--**
Crops	Vegetables	515.69	**569.25**
	Fruit and tree crops	53.36	
Livestock	Beef	401.84	**1,389.81**
	Mutton	804.04	
	Pork	48.9	
	Communal grazing	135.03	
T O T A L S		**1,959.06**	

** Sugar cane coverage as of end of 2005*
Source: NPDP, 2006

2.12 Water resources availability on the island of St. Kitts

The supply and distribution of potable water is the responsibility of the GOSKN through its Water Services Department. It is estimated that over 90% of the population in St. Kitts is served through house connections while the remaining 10% is located within acceptable distances from stand-pipes (400 m). In 2003, the total water consumption reached 1,540,593 thousand gallons as compared to 1,036,014 thousand gallons in 1993. Whereas surface water consumption has shown a declining trend in the period 1993-2003, well water consumption increased from 537,756 to 1,129,366 thousand gallons during the same period of time.

The principal ingredient into the water distribution system in St. Kitts is rainfall, which is either impounded in reservoirs directly through surface catchments, or is extracted from the ground water reserve through drilling. It is estimated that about 20% of the rainfall becomes ground water flow or a ground water recharge, accounting for approximately 30 million gallons per day (mgd). The Basseterre aquifer is the main source of ground water supply in St. Kitts, yielding an estimated 10 million gallons per day. It is forecasted that the future water demand would have to be satisfied primarily by ground water. Already there is one desalination plant operating on the island and at least two more are expected to become operational in the very near future.

Water quality is generally of an acceptable standard. However, after heavy showers the water becomes turbid. This is of major concern as water is treated only at the La Guerite treatment plant in Basseterre. In the rural areas, water is taken directly from streams and/or wells directly to the distribution systems. GOSKN is considering plans for the treatment of all water supplies in the very near future.

Future demand for water will be derived from population increase; increased in the number of households; higher levels of consumption; and the overall broadening of the economic base of the country. The housing sector and the tourism industry, in particular the accommodation and the emerging golf sector, are likely to be the major consumers of the country's potable water supply. There is therefore a need to undertake frequent water demand analyses to ascertain the WSD's capacity to respond to the anticipated increased demand. In this regard, the construction of desalination plants will become necessary if the WSD is to cope with increasing demands.

- The current total water production capacity is 7 million gallons per day (mgpd).
- 2 mgpd from Surface Springs and 5 mgpd from twenty-nine (29) tube wells (appendix 1).
- The wells range in capacity from 25 gallons per minute (gpm) to 400 gpm.
- Depth of wells ranges from 80 feet to 350 feet.
- Pumps size from 5 Hp to 100 Hp.
- There are also two (2) privately owned desalination plants with capacities of 0.8 and 1.2 mgpd; both supply golf courses.
- Very few persons in St. Kitts practice rainfall harvesting.
- There are no centralized sewerage; some of the hotels recycle/re-use gray-water from their treatment plants.
- We estimate that our total groundwater potential safe-yield is about 11 mgpd.
- We therefore have potentially another 6 mgpd to develop for future expansion (over the next 5 years).

2. Annual Water Consumption:

- Average total water consumption is about 5 mgpd.
- There are about 12500 domestic water connections (60% of usage).
- There are about 500 commercial connections (15% of usage).
- There are about 100 connections for farming/irrigation (5% of usage).
- 100 public standpipes and government facilities (10% of usage)
- System losses are about 10%.
- There is a steady pressure for more water to be made available for agriculture especially since the closure of the Sugar Industry.

3. Storage and Expansion Plans:

- There is no primary storage (Impounding Reservoirs).

- There are about 30 Service Reservoirs ranging in size from 40,000 gallons to 2 million gallons.
- Total storage capacity is about 5.5 million gallons in Basseterre/Frigate Bay and about 1.5 million gallons in the Rural Areas.
- Over the next five years Basseterre would need an additional one million gallons and the Rural Areas an additional ½ million gallons.

4. Price of Water:
    - The price for water (since 2001) is EC$15.00 per 1000 gallons for Commercial consumers and $7.20 - $12.00 per 1000 gallons for Domestic consumers.
    - Farmers are granted a concessionary rate of EC$8.00 per 1,000 gallons.
    - Estimated production cost is about $12.00 per 1,000 gallons.

Table 3: List of surface water sources, St. Kitts

SPRINGS	**AVERAGE FLOW (g.p.m.)**	**ELEVATION (ft. a.m.s.l.)**.
1) Wingfield	830,000	420’
2) Cayon/Greenhill	500,000	1590’
3) Franklands	240,000	1420’
4) Phillips	230,000	920’
5) Stonefort	50,000	1040’
6) Lodge	30,000	1590’
7) Milliken	30,000	1350’

Table 4: List of underground water sources, St. Kitts

WELLS	**PUMPING RATE (g.p.m.)**	**SIZE OF PUMP MOTOR (HP)**	**GROUND ELEVATION (ft. a.m.s.l.).**
1-41	310	75	63
1-48	250	60	67
1-47	210	50	50
Ponds I	325	75	71
Ponds II	400	100	90
Taylors	270	100	82
Conaree	45	10	102
Golden Rock (R.L.B.)	50	15	116
La Guerite	36	5	193
Lodge I	60	25	205
Lodge II	65	20	114
Mansion	150	20	79

Tabernacle	85	20	140
Profit	50	15	234
St.Paul's I	40	10	163
St. Paul's II	50	10	226
Ortons	50	20	214
Sir. Gilles	250	60	247
Godwins	120	20	81
Stonefort	150	30	150
Wash Ghaut	25	7.5	213
The Grange	165	60	196
Parsons	25	7.5	156
Wingfield	75	30	144
Ponds 5	200	60	70
Mattingley	25	20	163
Trinity	100	50	183
West Farm	40	40	262
White Gate	150	60	157

2.13 Energy Resources

The electricity supply and distribution network extends to all settlements on the island of St. Kitts. While the system has suffered from some operational and maintenance setbacks, the response by the GOSKN has been commendable. Presently, the GOSKN is improving the network under the Water and Electricity Supply Improvement Project. The equipment presently utilized by the Needsmust Power Station in St. Kitts has an installed capacity of 33.5 megawatts (MB), all diesel-fired. The island has experienced very high rates of growth of electrical energy and demand, exceeding on average 7.00% per annum in the last five years. The system peak demand increased from 4.0MW to 12.4MW in 1996, and reached 33.5 MW in 1999.

The energy sector in the Federation is run by two utilities: Saint Kitts Electricity Department (SKED), the state owned utility, in the island of Saint Kitts, and Nevis Electricity Company Ltd. (NEVLEC), the private-state owned utility, in the island of Nevis. Both utilities manage the production and distribution of the electricity. Saint Kitts relies on an installed capacity of 33.5 megawatts (MW). Nevis counts with an installed capacity of 13.7 MW. For each of the islands, the capacity is derived from seven diesel-fueled generators. The customer base comprises mainly industrial and commercial, and residential, or domestic, users. Table ?? illustrates the proportions of consumption according to the major users.

Growth in the Saint Kitts and Nevis economy, fueled by the expanding tourism sector, results in large increases in electricity demand through the year 2015. Growth in demand for electricity is estimated at 5.7% per year, which means that electricity consumption will increase by about 28.7% in the next 5 years.

SKED predicts the need for a 47.76% increase in installed capacity from 2005 to 2015, or a requirement of 16MWs of new generation capacity installed.

Table 5: Relative consumption of electricity in Saint Kitts and Nevis, by sector, 2004

Sector	Saint Kitts	Nevis
Domestic/Residential Use	41%	32%
Commercial/ Industrial	58%	65%
General Supplies	1%	-
Street Lighting	-	3%
Total	100%	100%

Based on a peak demand forecast for Nevis of 17.7 MW for the year 2015, a minimum of 84.7%, or at least 11.6 MW, of new installed capacity will be required from 2005 to 2015.

Losses in SKED and NEVLEC are slightly larger than the range of 10% for average worldwide losses in Transmission and Distribution (T&D) alone. Based on sales and generation, SKED had system losses of 13.1% in 2005, a decrease from 37.4% in 2004.

These losses include T&D losses and consumption at the power plant, its administrative offices, and from other unidentified sources. Also based on sales and generation, and after accounting for power plant consumption, NEVLEC had 20.9% system losses from T&D and other unaccounted sources during 2004.

Continued growth also requires that this energy demand be met and provided at the lowest possible prices. Current prices for electricity are considerably higher than comparable services in North and South America, and are on a par with those of other Organization of Eastern Caribbean States countries (current electricity costs, partly subsidized by the government, exceed US$0.22/kWh in Saint Kitts and can be up to US$0.27/kWh in Nevis). In addition, a huge national debt is exerting negative pressure on the ability of the government to expand generating capacity to meet the growing demand. By extension, the rising cost of fuel, and hence reduced access to energy, has the potential to severely undermine the standard of living of the people of the Federation.

Further, electricity supplies must be delivered in a manner that ensures protection of the local and global environments. Sustainable-energy technologies (renewable energy and energy efficiency) offer the potential to reduce electricity costs, enhance energy security, and protect the environment. With the drafting of the Energy Conservation Report by the country's Energy Committee and the support and inclusion of this Sustainable Energy Plan, the Federation of Saint Kitts and Nevis is taking important first steps to encourage renewable energy and energy efficiency development.

The following baseline and projections for the energy sector through 2015 are based on analyses prepared by SKED, NEVLEC, and other organizations. The baseline has been established for

purpose of comparison and is consistent with the goal of ensuring that sufficient, cost-effective, and reliable electrical power will be available to all customers to ensure economic development.

For the island of Saint Kitts:

- Installed capacity for 2005 was 33.5MW. The peak demand was 22.1 MW, and the average base load was around 15 MW. All installed capacity is derived from diesel-powered generators.
- Installed capacity in 2010 will be 53.9MW (31.1 MW additional diesel-powered generating capacity); peak demand in 2010 will be 32.9 MW.
- Installed capacity in 2015 will be 67.5 MW (22.4 MW additional diesel-powered generating capacity); peak demand in 2015 will be 41.2 MW.
- Greenhouse Gas (GHG) emissions from the sector in 2005 were 94,566 tons of carbon.
- The projected GHG emissions from the electricity sector in 2010 are 147,967 tons of carbon
- The projected GHG emissions from the electricity sector in 2015 are 185,295 tons of carbon.

For the island of Nevis:

- Installed capacity for 2005 was 13,7 MW. The peak demand was 8.6 MW, and the average base load is around 5 MW. All installed capacity is derived from diesel-powered generators.
- Installed capacity in 2010 will be 18.2 MW (7.2 MW additional diesel-powered generating capacity); peak demand in 2010 will be 11.8 MW.
- Installed capacity in 2015 will be 27.7 MW (18.7 MW additional diesel-powered generating capacity); peak demand in 2015 will be 15.9 MW.
- Greenhouse Gas (GHG) emissions from the sector in 2005 were 39,208 tons of carbon.
- The projected GHG emissions from the electricity sector in 2010 are 53,797 tons of carbon.
- The projected GHG emissions from the electricity sector in 2015 are 72,489 tons of carbon.

Energy Sector Targets

Proposed alternatives to the baseline and scenarios described above, including reductions in demand and additions to capacity via renewable energy systems, are based on the best available information from government and island stakeholders and considering project feasibility and commercial interest. The following targets are to be achieved by the energy sector in the years 2010 and 2015:

- Reduce projected electricity demand by 10% in 2010, resulting in a peak demand in 2010 of 40.2 MW, which will require an installed capacity of 48.5 MW.
- Reduce projected electricity demand by 20% in 2015, resulting in a peak demand in 2015 of 45.7% MW, which will require an installed capacity of 54.0 MW.
- Deliver 4.9 MW, or 10% of installed capacity, via renewable energy technologies in 2010.

- Deliver 10.8 MW, or 20% of installed capacity, via renewable energy technologies in 2015.
- In year 2005, 221,500 (SKED) + 88,070 (NEVLEC) = 309,570 US barrels of fas/diesel oil was consumed in the electricity production industry sub-sector of St. Kitts and Nevis.
- As a result of reductions in electricity demand, a reduction of the annual consumption of gas/diesel oil fuel for electricity generation of 425,300 US barrels can be achieved compared to baseline consumption of 471,400 US barrels in 2010 (9.8% reduction from the baseline.
- Reductions in electricity demand and increased use of renewable energy resources will result in a decrease of 483,500 US barrels of gas/diesel oil compared to baseline consumption of 604,200 US barrels in 2015 (20% reduction from the baseline.
- Reduce the annual GHG emissions from the electricity sector to xxx tons of carbon/year in 2010 and xxx tons of carbon/year in 2015.
- Reduce the consumption of gasoline and diesel fuel in the transportation sector to xxx barrels of diesel and xxx barrels of gasoline in 2010 (5% reduction) and xxx barrels of diesel and xxx barrels of gasoline (15% reduction) in 2015. These reductions will be achieved by a combination of measures, including the increased use of public transportation, the introduction of high-efficiency vehicles for local, government, and tourism, the deployment of a limited number of vehicles powered by alternative fuels, driver education and awareness to reduce fuel consumption, and improvements in road and traffic management.

2.14 Solid waste disposal

GOSKN recently constructed a five acre (2 hectare) sanitary landfill at Conaree in order to reduce the amount of garbage generated in homes and businesses and improve the collection and disposal of garbage. Wastes are compacted and covered thereby ensuring that odour, litter and flies are absent. It receives a variety of wastes which include sugarcane bagasse, construction rubbish, landscape rubbish, commercial and residential wastes. Features at the landfill include:

- Leachate control, landfill gas control, erosion and drainage control.
- An access road, fencing and other facilities.
- Landfill compaction equipment in the form of a bulldozer.
- Other equipment including a dump truck, waste oil and hazardous waste storage facility.

Apart from upgrading the facilities for collection and disposal of solid waste at the Conaree sanitary landfill, the project aims to develop programmes for reducing, recycling and recovering waste and update the law relating to waste management to ensure the maintenance of high standards.

Curb-side collection of residential wastes is undertaken throughout the country by the Solid Waste Management Authority. There are 5 garbage collecting vehicles on the island, 3 compactor vehicles, 1 rear loader and 1 side loader. Collection is undertaken daily in the city centre and at least once a week in other urban and rural areas. Some self-hauling of waste also occurs. Data is unavailable on the collection and disposal of industrial hazardous waste, however, no restrictions on these materials are in place at the Conaree sanitary landfill.

2.15 Sewerage

Sewage disposal is the responsibility of the Public Health Department. Presently, sewage is disposed of in one of the following three ways:

- ***Septic and absorption pits***: The vast majority of domestic and other premises use septic tanks and soak-aways for sewage disposal (55.8%).
- ***Pit latrines***: Commonly used by private households (39.0%).
- ***Private sewerage systems***: Utilized by major institutions such as the Joseph Nathaniel France Hospital in Basseterre, the Frigate Bay development area, the Garden's Housing Project, Trafalgar Development and Frigate Bay Beach Hotel.

All urban areas on the island of St. Kitts lack adequate treatment facilities for domestic sewage and waste water. The oceans are receiving effluents from a variety of land based sources of pollution, delivered to the coastal waters via streams and underground seepage. It is to be noted that these problems have potentially injurious environmental implications both for the public health and the natural environment.

3.0 LAND USE POLICY AND MANAGEMENT

3.1 Land tenure on St. Kitts and Nevis

Approximately 80% of the St. Kitts land resource is owned by GOSKN and about 7,000 acres are privately owned (*see Table 1*). The SEP accounts for 50% of the privately owned lands on the island of St. Kitts. The existing land ownership pattern is a direct result of the compulsory acquisition of the sugar estates in 1975 by the Government. In some cases, freehold interest has been granted by the Crown with respect to residential lands on former sugar estates while a lease hold interest has been given for some agricultural lands. The Village Lands Freehold Purchase Act of 1996 dealt explicitly with land ownership and opened up the possibilities for qualified tenants of lots of certain stipulated village lands the right to the freehold on the payment of legal fees, cost of transfer, stamp duty and land surveyor's fees.

The land tenure system is affected by lack of a proper land registration system. At present, there are two systems of land registration: (a) A registration of deeds system under the Registration and Records Act of 1881; and, (b) a Torrens registration system under the Title by Registration Act of 1887.

The registry is headed by a registrar who holds the position of registrar of the high court, registrar of patents and trademarks. Thus, there is no specific land registry. Furthermore, there is no system of computerization of records.

3.2 Land Use on St. Kitts

About 82% of the land in St Kitts is under permanent crops. The next two largest categories of land use are temporary crops at about 7% and natural grasslands occupying about 6.5% of the land. About 40% of the population lives in or around the capital Basseterre which is located on the coast. Much of the other settlements were developed along the coastal roads with a few small villages dispersed among the agricultural lands. The central part of the island is relatively steep and land above the 1000 ft. contour is designated as the forest reserve where no development is permitted.

Table 6: Land use by sector in St. Kitts (acres)

TYPE OF USE	ST. KITTS
Permanent Crops	10,287
Temporary Crops	865
Cultivated Pastures	91
Naturally Grown Grasslands	813
Fallow/Resting	252
Wood/Forest	24
Other unused Lands	140
TOTAL	**12,472**

The rural landscape is dominated by sugar cane plantations, with settlements interspersed in between. The increasing demand for agricultural land has, in recent decades, resulted in many small farmers clearing forested land in the upper slopes for farming. Such encroachment results in deforestation, soil erosion, and pollution of streams and coastal waters.

The major urban areas are Basseterre – the capital city – Sandy Point and Cayon. The drift from rural to urban areas over the past two decades has led to Basseterre becoming over-crowded. Sandy Point and Cayon are also experiencing expansion related problems. The city centre is, for the most part, well planned, being laid out on a grid-iron pattern. Near to the city centre, there are some other areas of well-planned low-to medium-density suburbs (Shadwell, Wades Garden, Ponds Pasture and Fortlands). Interspersed amongst these, are a few areas of high density residential developments.

3.3 Land use on Nevis

In Nevis, much of the population is located around the coastal capital, Charlestown. Most villages follow ribbon-style development along the island main road. There is more evidence of dispersed settlement patterns than in St. Kitts, primarily due to the construction of large homes on large land plots mostly by the expatriate community. Recently, there is an increasing change in land ownership to foreign nationals for upmarket residences on large plots of land.

3.4 Legal and institutional mandates

Several ministries have varying responsibilities and jurisdictions on aspects of land management. This section outlines (a) the main environmental legislation impacting on SLM; (b)the key agencies and their responsibilities; (c) the major constraints in the management of land degradation in St. Kitts and Nevis; and, (d) the major capacity development needs for the alleviation of these constraints.

3.4.1 Legal framework

An adequate legal and institutional programme is vital to sustainable land management. In recognition of this principle, GOSKN introduced the National Conservation and Environmental Protection Act (NCEPA) No. 5 of 1987. The NCEPA provides comprehensive authority for (a) the management and development of the natural and historic resources of St. Kitts and Nevis; and, (b) the establishment of protected areas to help conserve these resources. Protected areas, designated under this Act, must have the following broad purposes and objectives: (i) to preserve the biological diversity of wild flora and fauna species that may be endemic, threatened or of special concern, and the land and marine habitats upon which the survival of these species depends; (ii) to protect selected examples of representative or unique biological communities, both on land and in marine areas, and their physical environments; (iii) to sustain natural areas important for protection and maintenance of life support systems, and basic ecological processes including water recharge and soil regeneration; and, (iv) to protect selected natural sites of scenic beauty or of special scientific, ecological, historical or educational value, including sites that are already degraded and need protection for restoration or sites that may become degraded if not protected.

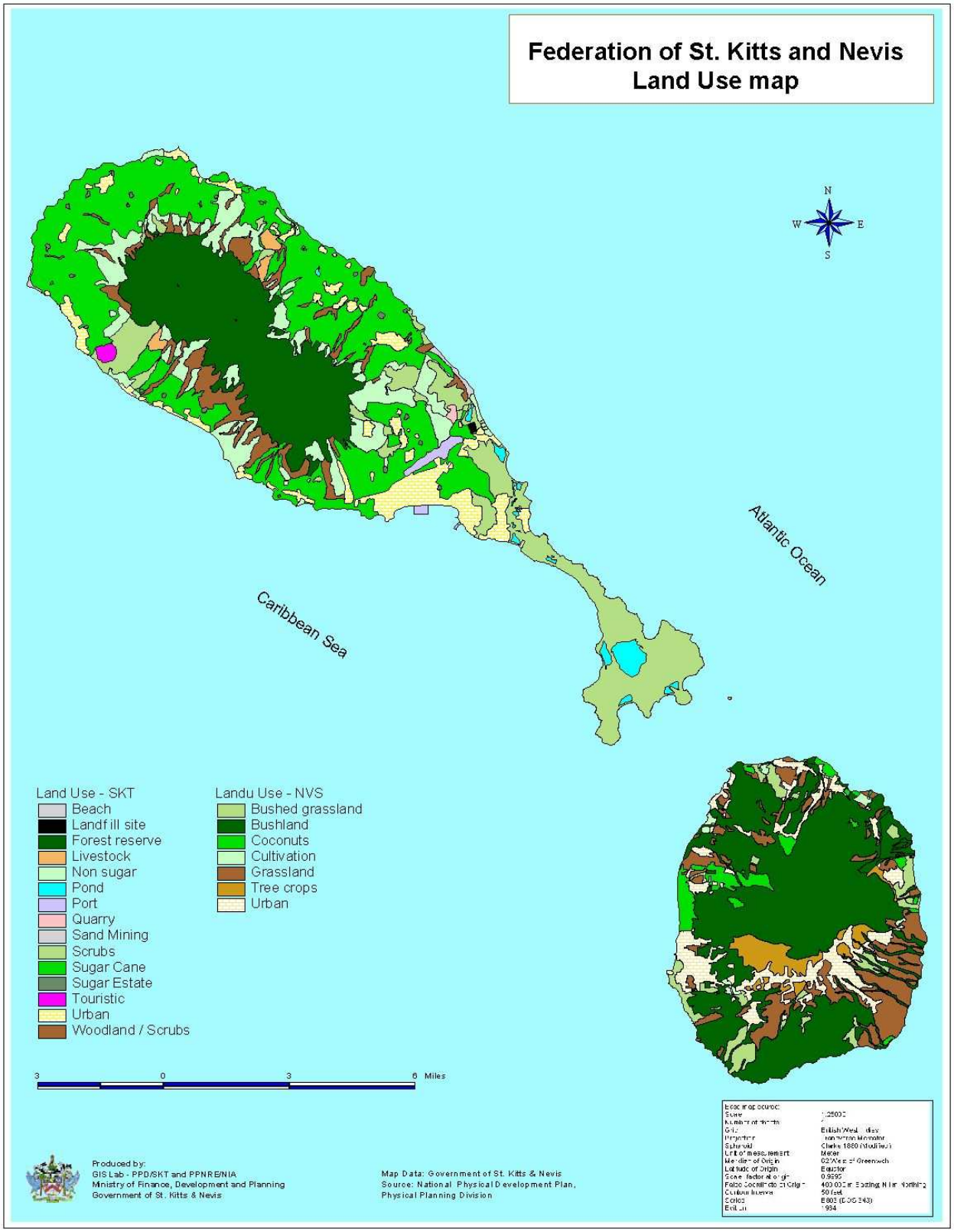

Federation of St. Kitts and Nevis
Land Use map
N
W
E
S
Atlantic Ocean
Caribbean Sea
Land Use - SKT
Beach
Landf ill site
Forest reserve
Livestock
Non sugar
Pond
Port
Quarry
Sand Mining
Scrubs
Sugar Cane
Sugar Estate
Touristic
Urban
Woodland / Scrubs
Landu Use - NVS
Bushed grassland
Bushland
Coconuts
Cultivation
Grassland
Tree crops
Urban
3 0 3 6 Miles
Produced by:
GIS Lab - PPD/SKT and PPNRE/NIA
Ministry of Finance, Development and Planning
Government of St. Kitts & Nevis
Map Data: Government of St. Kitts & Nevis
Source: National Physical Development Plan,
Physical Planning Division

Table 7: Principal Environmental Laws of the Federation of St. Kitts and Nevis

Environmental Law	Date	Authority	Regulations
National Conservation and Environmental Protection Act	1987	Control management and development of historic and natural resources	In preparation
Development Control and Planning Act	2000	Establish national planning and land use and control development and management of the island of St. Kitts	Building Code Building Guidelines Land Use Code in preparation Planning and Infrastructure Guidelines and Standards
Watercourses and Waterworks Act	1949	Control water supply and management	Watercourse Regulations
Public Health Act	1969	Maintain environmental health, control pollution and waste management	Public Health Regulations
Pesticides Act	1973	Control use of pesticides	Labeling/ Storage Regulations
Litter Act	1989	Restrict deposit of litter in public and private places	In preparation
Land Development Act/Nevis Housing and Land Development Act	1960 1988	Control land development on the island of Nevis	None
Frigate Bay Development Corporation Act	1972	Control development of the Frigate Bay area of St. Kitts	None

Part VII of the NCEPA covers forestry, soil and water conservation, and Section 35 provides for the establishment of forest reserves. The Minister is required to establish forest management schemes and the necessary regulations, including the prohibition of livestock grazing, although, to date, no regulations have been promulgated. The NCEPA also provides for the protection of soil in areas of critical natural drainage, and authorises the imposition of a fine for those who burn the land, fell trees or allow grazing in critical areas. Areas of special interest may be created where it is prohibited to cultivate the land, graze livestock, construct buildings or extract sand.

Part VI, Section 31 of the NCEPA makes provision for the protection of beaches and the coastal zone out to 2 km, and the Minister, is responsible for the preparation and implementation of a coastal zone management plan to regulate development. The Minister may declare certain areas

to be protected beaches, where activities such as fishing, the use of boats, certain sports, mining or the removal of treasures or artifacts from the sea bed are prohibited.

National planning legislation has been revised to reflect the current consideration of environmental concerns necessary to achieve sustainable development. The Development Control and Planning Act contains a legal requirement for conducting EIAs and environmental regulations have been incorporated into public and private development planning.

The Watercourses and Waterworks Act provides general authority to control water supply but does not address proper sewage disposal. The Public Health Act provides authority to address environmental health threats. These authorities and their implementing regulations will be revised to meet the current water pollution and waste management needs of the country. Regulations for both the Pesticides Act and the Litter Act will be introduced to allow proper implementation and full enforcement. Pollution control legislation is to be updated to address the emerging pollution problems affecting the country.

3.4.2 Key agencies and their responsibilities

St. Kitts

The Development Control and Planning Board (DCPB) was established by the Development Control and Planning Act (No. 14 of 2000). It has the power to designate an area in a development plan as environmentally protected and essentially seeks to prevent soil erosion and land degradation in its review of development applications. This function is carried out in consultation with the Minister of Sustainable Development. However, the DCPB has no jurisdiction over agricultural lands.

Within the Ministry of Sustainable Development, the two primary stakeholders involved in land management in St. Kitts are the Department of Physical Planning and Environment (DPPE) and the Department of Lands and Survey (DLS). While the DPPE plays an instrumental role in land management, its functions are mainly forward planning, development control and environmental conservation and protection. The DPPE is also responsible for the enforcement of coastal setback guidelines and the discharge of GOSKN obligations under several multilateral environmental agreements including climate change (UNFCCC), biodiversity (CBD), and desertification/land degradation (UNCCD). The DPPE also has the lead role in implementation of the National Conservation and Environmental Protection Act (NCEPA) and coordinates the implementation of the National Environmental Management Strategy and Action Plan (NEMS).

Actual utilization of land falls within the mandate of the DLS. Land leases and rentals are also administered by the DLS.

The management of land resources in terms of agricultural land use and soil conservation practices falls within the mandate of the Department of Agriculture (DOA). The DOA is also responsible for agricultural lands and the increase in non-sugar agriculture production, including both crops and livestock. This DOA oversees irrigation, soil conservation, and improved agronomy practices.

Over the years, the SSMC has been charged with managing the sugar lands on behalf of GOSKN. GOSKN owns approximately 82% of the land comprising approximately eight thousand acres under sugar cane cultivation and approximately five thousand acres which have been reserved to regenerate to secondary forest.

The National Housing Corporation (NHC) does not own land itself but is responsible for managing tracts of land primarily for conversion to residential development. Once infrastructure is laid down and ownership transferred to the homeowner the NHC is no longer responsible for maintenance or drainage.

The Ministry of Public Works, Utilities, Transport & Post through its Department of Public Works is responsible for quarries, coastal protection, drainage, resurfacing roads, erosion, flood control and the maintenance of infrastructure such as roads.

The Frigate Bay Development Corporation (FBDC) was established by an Act of Parliament in 1972 to develop lands within the 850-acre Frigate Bay area. The FBDC has the authority to prepare development plans, undertake construction, maintenance, building and engineering operations within its jurisdiction.

Nevis

The Department of Physical Planning, Natural Resources and the Environment (DPPNRE), of the Ministry of Communication and Works, Public Utilities and Posts, Physical Planning Natural Resources and Environment, Nevis Island Administration (NIA), is responsible for physical planning, development control and environmental management in Nevis.

The Department of Agriculture, in the Ministry of Agriculture, Lands, Housing, Cooperatives, NIA is primarily concerned with the promotion of crop and livestock production that is market led. The Department of Agriculture is also responsible for forestry, and ghaut management.

The Housing and Lands Corporation (HLC) in Nevis is responsible for making government owned lands available for housing, tourism development and industrial purposes. This agency is responsible for drainage on properties until they are sold.

3.4.3 Major constraints in the management of land degradation in St. Kitts and Nevis

- Limited understanding of land degradation and its impact on the economy and livelihoods by land owners, Ministers and other senior decision-makers is a barrier to the prioritisation of land degradation issues and the necessary allocation of resources.

- No clearly articulated and documented policy on land degradation or drought. The effects of existing policies on land degradation are also unknown.

- Limited national, participatory process for the prioritization of critically degraded areas for restoration, or for the control of major activities leading to land degradation.

- Unclear responsibility amongst the legislation that relates to land degradation.

- Limited functional coordination among institutions in responding to land degradation issues in a timely manner.

- Limited local expertise and training specific to drought preparedness and management and limited drought management activities in national work programmes.

3.4.4 Major capacity development needs for alleviation of these constraints

- Awareness building programmes on land degradation that target the land owners Ministers, other senior decision-makers, community/opinion leaders, NGO/CBOs on land degradation issues are needed, including how resources can be accessed internationally to implement local action. Orientation of magistrates, judges, lawyers and law enforcement officers on the environmental and socio-economic implications of land degradation is also needed.

- There is need for effective action championed by a Cabinet Minister. This coordination mechanism should oversee the development and implementation of the NAP. The Minister responsible for the environment should be the champion for environmental and land degradation matters to ensure that these matters be given high priority. The Government must strengthen institutions and systems to manage the causes of land degradation.

- Amendments to legislation and the establishment of an effective institutional structure/mechanism with responsibilities for coordinating the management of land degradation related issues will provide the much needed supportive environment.

- Building the capacity of local staff, community/NGOs partners and other collaborators to conduct relevant research, and to design and implement action to combat desertification/land degradation. Training of local personnel in drought preparedness and management is needed.

- The identification of sites for critical attention, and the development and implementation of site management plans would assist in alleviating land degradation.

- An analysis of the impacts of relevant national policies on land degradation and cooperation among key stakeholder agencies and groups is needed to guide policy reform or policy development.

3.5 National policy framework

Government policy may not be outlined in specific policy documents but may be gleaned from plans, projects and programmes that the government has developed and even speeches by Ministers. The following are some of the domestic policies related to the UNCCD:

3.5.1 Medium Term Economic Strategy Paper (2003 – 2005)

The 2003 – 2005 Medium Term Economic Strategy (MTESP) outlines GOSKN's intent to reduce current and potential environmental degradation and the adverse effects of current and future economic development among other things.

3.5.2 National Physical Development Plan (2006)

The National Physical Development Plan 2006 (NPDP) is a guide for physical development, with respect to land allocation, that considers the qualities valued by citizens and residents. The NPDP will be used to direct growth on the island when considering future land use, re-zonings, natural and heritage conservation, the provision of public infrastructure and aiding decisions for private sector investment. The draft St Kitts and Nevis Land Use Code seeks to strengthen the development and planning policies and proposals of the 2006 National Physical Development Plan and reduce the negative environmental, economic and social impacts of development projects.

3.5.3 Agricultural Strategic Plan (2005 – 2009)

The Agricultural Strategic Plan 2005 – 2009 aims to expand the development of non-sugar agriculture significantly and increase its contribution to national development. A market led approach will be taken towards crop and livestock production and objectives include developing farmer groups, strengthening the programme of services to farmers, and developing surface water sources.

3.5.4 National Environmental Management Strategy

The Government of St. Kitts and Nevis adopted The St. George's Declaration of Principles for Environmental Sustainability in the OECS in 2001. This document underscores the obligation of Member States, of the Organization of Eastern Caribbean States (OECS) to ensure the sound management of their biophysical environment. In keeping with the terms of the St. Georges Declaration, St. Kitts and Nevis undertook to develop a National Environmental Management Strategy (NEMS).

The St. Kitts and Nevis National Environmental Management Strategy (NEMS) was adopted by the Government in April 2005. The NEMS defines the specific directions and mechanisms for more effective policy implementation and includes specific actions necessary and results expected to realize the policy objectives of the government. It articulates the key strategies and priority actions for environmental management in the context of sustainable development.

With specific reference to land degradation, the NEMS proposed measures to restore environmentally degraded areas and to ensure the sustainable use of natural resources in a manner which recognizes the intricate linkages between ecological systems in small island states, and between these systems and human activity, and which reflect the principles of island systems management. Key activities are: (a) formulation of criteria for and identification of environmentally degraded areas; (b) identification of critical areas for erosion control, and

develop and implement remediation projects with community participation; and, (c) preparation of Special Area Plans or Local Area Plans to restore these areas, with assigned responsibilities, costs, and schedule.

It is expected that over the next five years, line ministries and other relevant agencies in the Federation of St Kitts and Nevis will adopt the recommendations/policies that are relevant to their work plan.

3.5.5 Nevis Integrated Strategic Development Plan (2001 – 2005)

The Nevis Integrated Strategic Development Plan 2001 – 2005 tries to promote balanced growth and effective resource utilization in achieving sustainable development. Some of the strategies that related to land degradation are the pursuit of research and experimentation in agricultural management practices relative to soil, stemming problems of desertification and soil erosion through maintenance of vegetation cover on lands susceptible to erosion, minimizing soil pollution and upgrading the administrative framework for environmental management.

3.6 Relevant regional projects

This NAP supports a number of regional projects that addresses the promotion of the adoption of sustainable land management policies and strategies. These include the following:

3.6.1 The OECS Protected Areas and Associated Livelihoods (OPAAL) Project

The OECS Protected Areas and Alternative Livelihoods (OPAAL) Project is a multilateral project between six (6) OECS Participating Member States, the Global Environment Facility (GEF) and the World Bank. OPAAL is a five (5) year project with a total estimated budget of US$ 7.57 million dollars of which the GEF is providing US$ 3.5 million dollars as a grant. Co-financing of US$ 3.5 million dollars is provided by the Organisation of American States (OAS) and the Fond Francais de L'Environment Mordial (FFEM) and the Governments of the Participating Member States.

The objectives of the OPAAL project are to contribute to the conservation of biological diversity of global importance in the OECS by removing barriers to the effective management of protected areas and increasing the involvement of civil society and the private sector in the planning, management and sustainable use of protected areas. The project also seeks to contribute to the economic development of Small Island Developing States (SIDS) in the OECS through the sustainable use of natural resources.

The OPAAL project will provide a number of benefits to the participating member states. These include:

- Assisting in the conservation of globally significant species of flora and fauna, as well as the habitats in which they occur;
- Improving environmental integrity and natural amenity values such as watershed protection and protection of resource base for the tourism industry;

- Development of constituencies for biodiversity conservation which will help to promote conservation and sustainable development, resulting from tangible economic and improved livelihood opportunities;
- The empowerment of target groups or persons associated with protected areas for support of livelihood or the provision of alternative activities;
- Provide citizens and visitors with benefits from recreational and cultural opportunities provided by the project; and,
- Provision of employment opportunities for residents of the surrounding communities.

The OPAAL Project for St. Kitts and Nevis was launched in May, 2005 and the site selected is the Central Forest Reserve above the 1000 feet contour on the island of St. Kitts. This area covers a land space of approximately 50 km² or 12,500 acres and consists of a mountain cluster dominated by three (3) volcanic centers and a chain of residual hills. The site represents the last remaining area of tropical forest on St. Kitts and as such is of great significance for the conservation of biological diversity in the area. The area also provides protection and the sustainable management of vital water resources.

The proposed central forest protected area houses a series of nature and scenic trails supporting the majority of eco-tourism ventures as well as recreational and educational programmes. The area is rich in floral biodiversity according to the last detailed study that identified 926 plant species, 45 of which were considered endemic to the country or the Lesser Antilles. The area also represents the primary source of water for national consumption. The protection of the watershed as well as the six (6) primary and two (2) secondary water catchments remains a top priority for environmental management in St. Kitts. The area remains healthy although there is some evidence of encroachment by farmers above the 1000 feet contour. The closure of the sugar industry and clear evidence of illegal farming in some areas of the Central Forest Reserve reflect the urgent need for a regime of management that would protect the natural resources of the area.

3.6.2 UNDP's Integrating Watershed and Coastal Area Management (IWCAM) in the Small Island Developing States of the Caribbean

Small Island Developing States (SIDS) have special conditions and needs that were identified for international attention in the Barbados Programme of Action for the Sustainable Development of Small Island Developing States and through the World Summit for Sustainable Development's Johannesburg Plan of Implementation. GEF recognises certain unique water-related issues that are common to most SIDS (including coastal area management and biodiversity, tourism development, protection of water supplies, and land and marine-based sources of pollution), and has consequently confirmed the eligibility of related international waters projects.

The main focus of this project is the demonstration of integrated watershed and coastal area management systems, which will stress the need for development of a cross sectoral management approach. Components to be addressed include the requirements for institutional and infrastructural realignment; adoption of modalities for sectoral participation; capacity building; linkages to social and economic root causes of environmental degradation; and the overall need for sustainability. The long-term goal is to enhance our own capacity to plan and manage our

aquatic resources and ecosystems on a sustainable basis and to ensure the protection and sustained use of our main coastal water aquifer – the Basseterre Valley.

3.6.3 National Capacity Needs Self Assessment Project

The Government of St Kitts and Nevis is in the process of undertaking its National Capacity Needs Self Assessment (NCSA) for global environmental management. The principal objective of the NCSA is to identify country level priorities and needs for capacity building to address global environmental issues, in particular biological diversity, climate change, and land degradation. The aim here is to combine domestic and/or externally assisted action to meet environmental management needs in a coordinated and planned manner.

While the three focus areas identified are central to the exercise, the NCSA is also expected to explore the common linkages among them, as well as synergies within the wider concerns of environmental management and sustainable development. The overall project objective is to identify and determine critical capacity constraints related to effective environmental management in St Kitts and Nevis, and to develop a plan of action to address these constraints so that national capacity is enhanced in a sustainable and cost effective manner.

3.6.4 UNEP's preventing land degradation in small island ecosystems through SLM project

It has long been established that Small Island Developing States (SIDS) like St. Kitts and Nevis have many disadvantages arising from their size, including small populations, thin market size, a narrow resource base, vulnerability to extreme weather events, limited watersheds and threatened supplies of freshwater. The Barbados Programme of Action (BPOA) on the Sustainable Development of SIDS recognizes that land and ecosystem degradation and the loss of critical goods and services such as biodiversity habitats and watersheds, are among the major long-term management issues in these countries due to a combination of factors including deforestation, urbanization, unsuitable farming practices and inappropriate land use policies.

Fahies Agricultural Settlement is one of the most important small farmer food production areas in St. Kitts and Nevis. The recent closure (2005) of the long standing sugar industry in St. Kitts and Nevis creates an opportunity for expanding the settlement area using former sugar lands and involving ex-sugar workers. This is a policy decision by the Government of St. Kitts and Nevis aiming to expand the national effort in agricultural diversification given (a) the increasing demand for food locally and regionally; (b) the growing number of tourist arrivals to the islands; c) the thrust to achieve the Millennium Goals of alleviating poverty and improving the country's food security position; and (d) the need to create alternative employment opportunity in a traditional farming area. However, it is recognized that the sloping lands are vulnerable to soil erosion that could speed up the rate of land degradation and very quickly render these lands unproductive. Farmers have very limited experience, are reluctant to invest on lands for which the tenure is insecure, and lack the resources to implement land management practices that limit soil degradation. Yet the escalation of land degradation would seriously affect the income, livelihood and well-being of hundreds of rural families and threaten food security. Therefore, to prevent land degradation, to foster sustainable agricultural production and to meet the national

objective for food security and poverty alleviation, this GEF project is being proposed to supplement the present effort of the Government and other donor partners. The project would involve expansion of the Fahies Agricultural Settlement, the settling of 40 ex-sugar workers on farm land with a long term lease agreement, the implementation of sustainable land management (SLM) practices, provide incentives to farmers for long term investment in SLM practices, and farmer training, all to the direct benefit of at least 80 farm families (including 40 existing farmers at the Settlement) with indirect socio-economic benefits for the entire rural community in the Parish of St. Paul and residual benefit for farmers in other locations, mainly through demonstration and training.

Among the areas of concern are the following:

- Soil erosion due to poor soil conservation practices and unsustainable farming practices;
- Insecure land tenure system predominates in the farming sector, leading to lack of investment and no sense of ownership;
- Overstocking and overgrazing made worse by periodic periods of severe drought;
- Stray livestock destroying vegetative soil cover;
- Farming on high sloping lands/ and or on lands close to steep ghauts, leading to severe soil erosion during times of intensive rainfall; and,
- Poor drainage system leading to significant feeder road erosion, flooding of downstream settlements, top soil ending up in the sea, damage to infrastructure and ghaut or stream destabilization.

Notwithstanding the important interventions being made by the Government, by Donor Partners and Technical Support Agencies, and by NGOs to foster the development of farming in the project area, the poor land management practices presently need to be reviewed and improved considerably so as to arrest the trend in top soil loss, its consequential reduction in productivity and so that the benefits of increased agricultural output and farmer income can be sustainable in the long run. The GEF project will address this constraint. The introduction and implementation of the land management practices by this GEF project would restore and preserve the soil and its productivity and conserve soil moisture in ways which will enhance the current technical and small grants support the Settlement is enjoying presently, especially since the small farmer Settlement area is to be expanded southeastward to include former sugarcane lands on Sir Gilles Estate and northwestward to include former sugarcane lands on Brotherson/Belmont Estates. Furthermore, the allocation of lands to ex-sugar workers by long lease agreement, for the purpose of farming is a major objective of the Government of St. Kitts and Nevis. These lands have variable slopes and are bordering a number of ghauts or drainage waterways that meander from mountain to sea. Therefore, the area is vulnerable to soil erosion during times of heavy rainfall.

The overall objective of the project is to control or minimize soil erosion and eventually to sustain soil fertility, conserve soil moisture and increase agricultural productivity. The specific objectives are:

a) To protect crop and grazing lands from soil erosion by a combination of physical and biological methods so as to improve their productivity;

b) To improve the management of surface runoff in farmers fields during high rainfall;
c) To raise awareness among farmers of the need for soil and water conservation in their farming practices;
d) To improve pasture management and on-farm stocking rates through the use of rotational paddocks and supplementary fodder feeds;
e) To strengthen the in-country institutional and human capacity to support the delivery and sustainability of the land management practices to be implemented while providing for the dissemination and replicability of the interventions country-wide;
f) To create awareness of the importance of environmental management among various stakeholders and the wider public;
g) To improve the national policy and regulatory framework and economic incentive environment in order to support the SLM project investment interventions.

Over a three year period a number of soil and moisture conservation practices will be introduced and demonstrated to farmers with the farmers' involvement in implementing the practices on their farms. Where appropriate, group demonstrations will be done with farmers assisting each other to encourage farmers' group formation and organization. Farmers working together would be an important part of ensuring sustainability of the land management practices in the long term and will enable farmers to purchase useful tools and critical maintenance equipment as a group. Among the practices to be demonstrated are:

- Vegetative contour hedges and contour farming
- Conservation tillage and crop residue management
- Mulching
- Windbreaks
- Pasture management and proper use of grazing.

Awareness-Raising

The project would arrange visits for farmers to badly eroded areas, on site and elsewhere on the island, engage farmers in dialogue as to the causes, show what are rill, sheet and gully erosion, and demonstrate how to correct and prevent further erosion as well as visit sites where the soil and water conservation techniques have been implemented in the past, albeit on a larger scale by the SSMC. In addition, the project would produce and/or purchase teaching materials for use in farmer training with application in other communities and other countries throughout the Caribbean Region. A video will be produced as part of documenting the various phases and activities of the project and would be used for future training and shown on national television to improve public awareness of land degradation and possible ways to address it through SLM.

Capacity Building

The project would facilitate capacity building including the strengthening of the legislations and regulatory framework governing environmental conservation and preservation. As part of its contribution to the project, the Government would allocate budgetary and human resources so as to strengthen the delivery of agricultural extension services to project farmers while allocating land to farmers on a long term (35 years) lease basis. Other Institutional, technical and Donor support (including grants/soft loans) would be provided by CARDI, ROC on Taiwan, FAO, IICA

and NGOs. Credit support to farmers would be sourced from the Development Bank of St. Kitts and Nevis, CDB, and The Foundation for National Development, and from Credit Unions on both islands.

Targeted Research

As a basis for further improvement in the local understanding and capability to assess land degradation, its causes, consequences, economic costs and ways to redress and mitigate against it, the project would finance, equip and provide technical investigative support for the project beneficiaries and for the national benefit. This would include measuring and estimating rainfall intensity, water/drainage flows and soil loss with and without project situations. The data would be important in the monitoring and evaluation component of the project. It is anticipated that the project would develop a comprehensive data and information base upon which decisions can be made on a more informed basis and on objective rather than subjective information with respect to both land degradation and sustainable land management practices. The targeted research effort would result in the adoption of innovative SLM practices and technologies, including early warning and monitoring systems especially as they relate to extreme climatic events. The research would demonstrate the measuring of soil fertility, the benefit of soil and water conservation techniques, proper pasture establishment and grazing techniques, fodder and other vegetative establishment. The targeted research component of the project would also seek to improve the local and national understanding of policy and institutional failures that drive land degradation.

Project Benefits

The main benefits of the project would accrue to the 40 new farmers and 60 existing farmers whose farmland would be conserved and protected from soil erosion and who would benefit from increased crop and livestock productivity or yield. Farm income would also increase and there would be an expansion of income-generating activities as a result of the project. Some ex-SSMC employees would gain employment in the area. In effect, by fostering sustainable land management, the project would contribute to food security in this rural community in particular and to the country in general. Other farmers outside the project area would receive training and can proceed to adopt the practices demonstrated on farms within the project area.

The country would also benefit from the stable enhanced environment beautified and preserved by the planting of trees and vegetative contour hedges, especially since the lands are State owned. Furthermore, families living in the communities would benefit from an improvement in the general social and economic infrastructure of the area. There would be an avoidance or significant reduction of top soil loss that ends up in the coastal waters during flooding, and a reduced risk of inorganic fertilizers and pesticides moving off the targeted area into the coastal waters. Finally, there would be a strengthening of the farmers and institutional capacity on the islands to assess land degradation and determine and take the correct actions to prevent soil losses, minimize flooding, improve pasture management and to improve the national awareness of the consequences of land degradation and the benefits of preservation and conservation of the natural resources of the country.

Table 8 summarizes the main global and local benefits of implementing this GEF project. The global benefit would include improved ecosystem resilience and productivity.
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Table 8: Global and Local Benefits

Benefits	Global	Local
1. Reduced rates of soil erosion	X	X
2. Improved water conservation and replenishment of under ground aquifer leading to increased crop yields	X	X
3. Protection of ecosystem function and resilience	X	X
4. Reduced downstream flooding and sedimentation	X	X
5. Increased carbon storage	X	
6. Promotion of livelihood sustainability		X
7. Improved nutrition and reduction of poverty	X	X

Sustainability and Stakeholders' Involvement

Government Support: The land identified for allocation to new and existing farmers and which would benefit from soil conservation practices to be implemented by this project belongs to the State. The Government of St. Kitts and Nevis would lease about 60 acres of former sugarcane lands around Fahies Settlement to the farmers on a long term basis as an incentive for farmers to invest their resources in soil and water conservation practices and other land management practices. Furthermore, the Government would contribute an estimated 19% of implementation costs or US$133,970 to the project both in kind and actual financing of salaries of some of the technical experts to be drawn from various Government Departments. The Government would zone the area as agricultural lands so as to foster the long term conservation plans. The Department of Agriculture would strengthen the extension support for the area in order to encourage the use of new technologies and sustainable agricultural practices alongside the introduced soil and water conservation practices. A strengthening of the National Conservation and Environmental Protection Act of 1987 would give force to the environmental preservation and conservation measures implemented by this GEF project.

Stakeholders Participation: Participation of the community is clearly crucial to the successful implementation of the project. The consultative process to further elaborate the plans for the area must perforce continue to include the farming community and potential beneficiaries. Already the various Ministries of Government, Donor partners and Allied Agencies, and NGOs are engaging the farmers and the communities including the Fahies Women Association and other existing groups. Farmers working together as a group to implement the soil and water conservation practices would ensure long term sustainability and maintenance of the project and its benefits. Of course the financial attractiveness of the project to participating farmers is being emphasized to foster the willing and voluntary acceptance of the project by farmers. Yet it is known that conservation activities do not yield immediate and obvious financial benefits in all cases. Therefore, it is necessary to find actions which combine immediate profitability with the desired conservation effect and in this project these include the use of forage trees and fruit trees

for conservation, and grasses and legumes which provide ground cover as well as useful feed for animals.

The proposed planting of vetiver grass as contour hedges would involve farmers foregoing the use of some of the land otherwise used for growing crops. It is a challenge to convince existing farmers to allocate part of their plots to grow the hedges. Farmers are to be taught the benefits of the conservation measures which include in some instances the improvement in land productivity with its consequential benefit in increased crop yields, better quality produce due to improvement in moisture availability, and ultimately increased income.

Replicability

The project will provide funding to assist in the establishment of a vetiver grass nursery within the Project Area. The nursery would provide a source of planting material in the future not only for project farmers, but also for other farmers outside the Project Area who will benefit from visits to Project farms and from training workshops conducted under the project. The project would strengthen the institutional capacity of the various government departments and farmer groups so as to deliver similar soil and water conservation projects to other locations on both St. Kitts and Nevis. Moreover, the incorporating of environmental policies and actions into the both the Government's long term and short term development strategies would lead to the replication of the introduced soil and water conservation measures. The project can also be repeated in other OECS countries and indeed in other CARICOM States under similar conditions.

The proposed project is consistent with national priorities and the sector development strategies of the Government of St. Kitts and Nevis, especially since it addresses the areas of sustainable land development, food security and poverty alleviation. With the decision by the Federal Government of St. Kitts and Nevis to close the sugar industry effective July 30, 2005, the economy of St. Kitts and Nevis is undergoing a major transformation from a traditionally sugar dominated economy to a more diversified economy. Taking into consideration the fact that the sugar industry dominated economic activities in St. Kitts and Nevis for over three and a half centuries, the decision to close it is a major undertaking in a Small Island Developing State (SIDS). In particular, the agricultural sector is being restructured to focus on expanding production of non-sugar crops, small and large ruminants, fruit and tree crops, horticultural crops, fisheries and reforestation. The country is relatively inexperience in the large scale production of these non-sugar agricultural products. Therefore, the challenge is a major one.

As the country considers plans to diversify the use of agricultural lands away from sugarcane cultivation, a number of land management issues come to the fore. Some of the critical land management issues were recently highlighted at national discussion forums on transitioning from sugar and these would be developed later in the Section on **Strategic Context.** Among the issues of concern is for the country to have a Land Management Unit whose primary role is to continue and improve upon the soil conservation programme formerly done by the sugar company, SSMC, especially with the proposed changes in land use post sugar. Moreover, it is broadly acknowledged through national consensus that land degradation is occurring particularly on the upper sloping farming lands, along the feeder roads, in the ghauts and along coastal areas. In

fact, there are known instances of accelerated soil losses on sloping lands where other food crops that provide poor soil cover replaced sugarcane.

The opportunity being provided by this project is timely, in that it allows St. Kitts and Nevis to sprepare a project that is relevant to the current effort to diversify the use of agricultural lands and to target both existing and new farmers on the island of St. Kitts.

3.6.5 UNDP's LDC/SIDS Mainstreaming Sustainable Land Management project

The Federation of St. Kitts and Nevis is presently undergoing a transition from a way of life that evolved over four centuries of sugar cane cultivation to a political-economy that is influenced by tourism, the vagaries of international trade and uncertain environmental futures. In addition there are other anthropogenic factors that contribute to pressures on the island limited land resources including unmanaged quarrying activities and animal pasturing. This project will therefore provide support for the development of strategies that will contribute to sustainable land management in particular and overall sustainable development. The long-term goal that it will seek to achieve is: *The agricultural, forest, residential, tourism and urban land uses of St. Kitts and Nevis are sustainable, so that ecosystem productivity and ecological functions are maintained while contributing directly to the environmental, economic and social well-being of the country.*

To meet this goal the project has as its main objective to create an appropriate institutional framework with the requisite tools and resource capacity to undertake effective management of environmental change and mainstreaming of sustainable land management (SLM) in a post sugar era. It is envisaged that four main outcomes will be achieved at the end of the three year project which will be implemented under guidance of the Ministry of Sustainable Development. These are: mainstreaming of SLM principles into relevant national institutional and legal frameworks; creation of appropriate institutional arrangements for effective land management including the formation of a land management unit; development of human and technical capacities for land management along with the request knowledge and information base.

The project will involve a participatory approach with multi-stakeholder involvement both in implementation of the range of activities geared to improve the present status of land management. While funding will be provided by GEF, co-funding will come from the Government of St. Kitts and Nevis and other development partners. It is intended that the combination of involvement from local to global, along with built in measures for monitoring, evaluation and capacity development, will contribute to sustainability of programs long after the closure of the of this project.

4.0 CAUSES OF LAND DEGRADATION IN ST. KITTS AND NEVIS

Land degradation in St. Kitts and Nevis can be attributable to four main reasons: (a) overuse of lands for monocrop sugar cane agriculture; (b) clearing of lands for residential and tourism development; (c) farming on high elevations above the 1000 ft contour; and, (d) squatting and unregulated settlements. The island's land resource is subject to competing demands in terms of agriculture, tourism, housing, services and facilities. Uncontrolled competition for land use can cause land degradation as outlined below:

- a shrinking agricultural land base;
- denuded forests and water catchment areas;
- spontaneous settlements on unserviced land;
- building activity in hazardous locations;
- inadequate solid and liquid waste management systems;
- coastal zone degradation; and,
- traffic congestion.

4.1 Key land degradation concerns

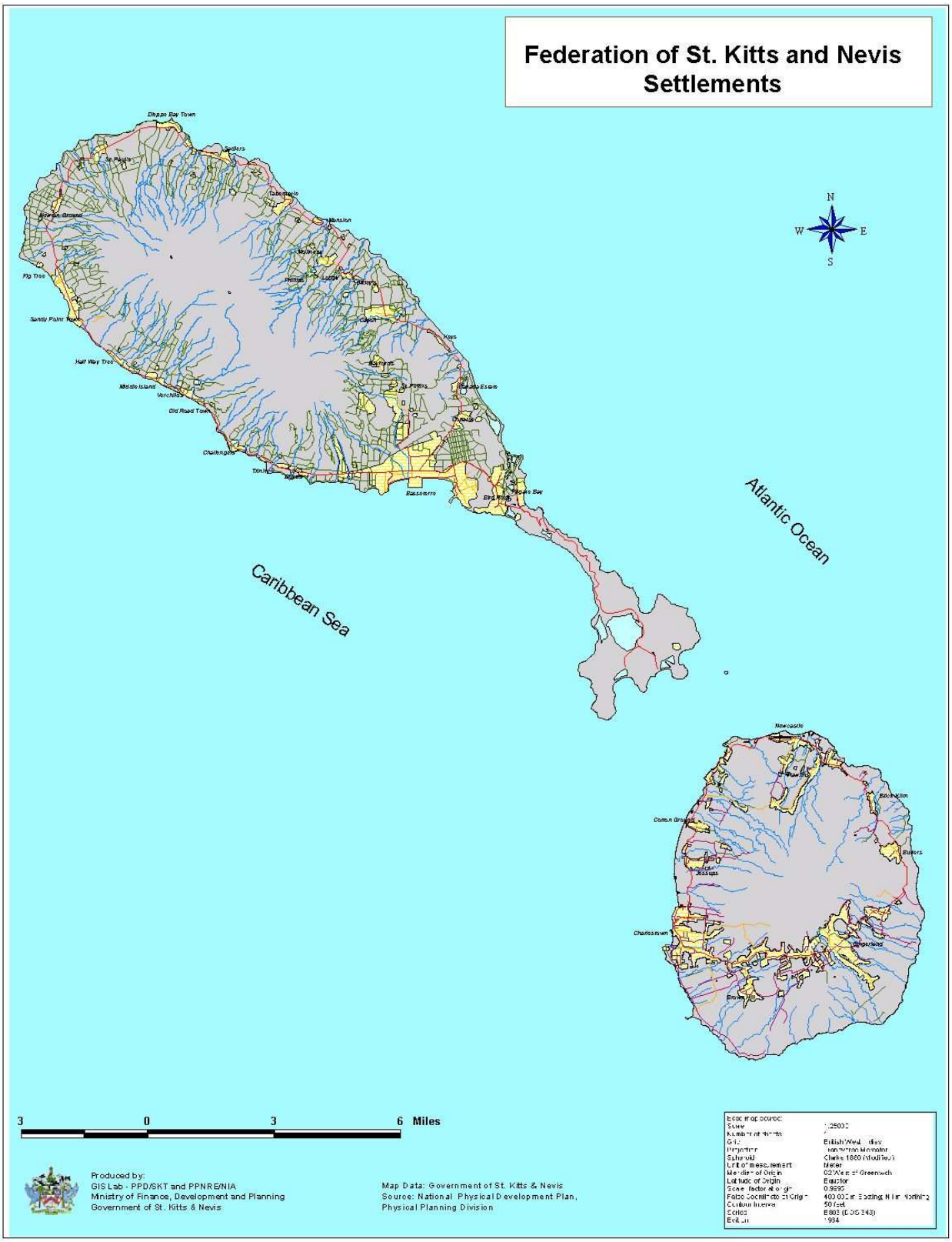
Preparation of this NAP has benefited from the outputs of several community, sectoral and national consultations that took place across the country from November 2005 through May 2006. These consultations served as awareness building and issues identification opportunities on matters related to environmental management, including land degradation. These consultations were part of the process leading to the preparation of the National Environmental Management Strategy (NEMS) and the National Capacity Needs Self Assessment (NCSA). Land degradation concerns that were identified during these consultations included water pollution, deforestation, erosion, poor drainage, flooding, sedimentation, over-grazing, fires, awareness and education, and enforcement. These concerns are amplified briefly below.

4.1.1 Water Pollution

In Basseterre, especially along Bay Road, the discharge of contaminated water and other wastes into the sea from residential areas, restaurants and hospital is often visible. The potential/possible contamination of the Basseterre aquifer from fertilizer use and the high bacterial count at most water quality monitoring stations due to domestic wastes, sewage treatment plant effluents, sugar factory wastes, and farm wastes were cited as major concerns.

4.1.2 Deforestation and Erosion

Deforestation on some hillsides in St Kitts mainly for charcoal, poles, fish traps, shacks and small farms on steep slopes is evident in several areas. Cutting of mature vegetation [delete Deforestation] in Nevis is attributed to the demand for fish pot sticks, charcoal, boat building materials, and construction materials for houses and joinery. The clearing of vegetation for houses on both steep and gently sloping lands additionally contributes to soil erosion, especially during the rainy season.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GIS Lab - PPD/SKT and PPNRE/NIA
Ministry of Finance, Development and Planning
Government of St. Kitts & Nevis
Map Data: Government of St. Kitts & Nevis
Source: National Physical Development Plan,
Physical Planning Division

Areas with excessive erosion include the beach at Frigate Bay, Pinney's Beach, Halfway and New Guinea Coasts, College Ghaut, lower Monkey Hill, Wades Garden, Old Road Bay, Brimstone Hill area, and the Southeast Peninsula.

4.1.3 Flooding/poor drainage

Maintenance of drainage and roads and other soil conservation activities in the sugarcane lands is critical to minimizing flooding and erosion, particularly with the closing of the St Kitts Sugar Manufacturing Company in July 2005. The cutting of the road to the project in Banana Bay without appropriate erosion prevention measures and destruction of wetlands causes drainage problems in adjacent areas. Poor drainage in the vicinity of Greatheeds Pond causes the road to become impassable in heavy rains. The surface drainage in Charlestown is inadequate and contributes to flooding especially in rainy weather.

Discharge of water from housing projects, especially runoff from heavy rains, are not properly managed and also contributes to erosion and flooding.

4.1.4 Sedimentation

Unregulated quarrying causes erosion and leads to sedimentation on adjacent lands, on the roadways, in ghauts, ponds and the smothering of corals in the near shore marine environment.

4.1.5 Overgrazing

An abundance of feral donkeys (in Nevis) and free ranging livestock have denuded the vegetative cover in several areas and scarred the land surface (trenching by pigs). Overgrazing by untethered animals accelerates erosion and is more pronounced in the dryer parts of the country, especially at Baths, Indian Castle and in the Southeast Peninsula.

4.1.6 Fires

Uncontrolled bush fires have caused extensive damage to landscapes and increases the potential for soil erosion and sedimentation on adjacent marine habitats. This problem is severe in the Southeast Peninsula, however, because much of the land is privately owned (often absentee owners); effective solutions are difficult to prescribe.

4.1.7 Public education and awareness

Consistent efforts for awareness building and education on environment matters particularly on land degradation, is inadequate. An evaluation of the effectiveness of existing and past awareness and education activities is needed so as to better guide future efforts.

Information overload and insufficient interest among the media managers to be actively involved in the dissemination process for environmental information were identified as critical concerns. Environmental issues are generally not seen as exciting or interesting enough to get serious attention among the media, especially in the light of higher profile domestic issues.

4.1.8 Enforcement

Legislation reform and court procedures for prosecution reform have been initiated but are taking too long to be improved. The limited exposure of the legal personnel including magistrates, to environmental issues and impacts, and lack of adequate legal staffing minimize the effectiveness of the legal system. Outdated legislation and poor enforcement, including planning guidelines and zoning regulations are major weaknesses.

Sharing of information among agencies and coordination of efforts to enforce legislation is not adequate.

PART TWO: WHY WE NEED A NAP

5.0 WHAT IS A NATIONAL ACTION PLAN (NAP)?

The National Action Plan broadly diagnoses desertification, land degradation and drought issues affecting a country and identifies long-term strategies to combat it. These include preventative and corrective institutional, legislative and physical measures as well as financing mechanisms, the adoption of appropriate technology, knowledge and know-how. Central elements of a NAP are as follows:

- Identification of factors causing land degradation and practical measures to combat it;
- Specification of the role of government, local communities, land users and the resources available and needed;
- Development of long-term strategies that emphasize integration and implementation with national policies for sustainable development;
- Emphasis on preventive measures for land not degraded;
- Promotion of cooperation among all relevant groups;
- Provisions for effective participation; and,
- Building of reliable partnerships for sustained support.

6.0 JUSTIFICATION FOR THE NAP

Over the past four centuries, the sugar cane plant, not only moderated the influence of green house gas emissions on the environment of St. Kitts and Nevis but also, protected and preserved the fragile volcanic soils of the islands preventing both disastrous flooding and erosion. Sugar cane also allowed for the infiltration of rainfall and the recharging of the extensive underground coastal aquifers. Apart from the closure of the sugar industry (*see Section 4.1*), the country faces other significant challenges with respect to the sustainable use and development of its land resources. In this regard, specific land degradation issues affecting the country are further discussed in *section 7.0*.

6.1 Closure of the sugar industry on St. Kitts

In 2005, GOSKN opted to close the sugar industry on the island of St. Kitts. Without this extensive land cover, and given the topography of the island with its central volcanic cones whose steep hillsides are punctuated by numerous *ghauts* draining the hinterland and discharging into the surrounding sea, not only would there be widespread loss of fertile top soils, but there would be considerably more land-based pollution of the sea, further destroying the already stressed and threatened coral reefs.

The Federation of St. Kitts and Nevis is presently undergoing a transition from a way of life that evolved over four centuries of sugar cane cultivation to a political-economy that is influenced by investments in the development of tourism, the vagaries of international trade and an uncertain environmental future. It is vital to plan now in order to safeguard both soil resources and infrastructure on St. Kitts. The sustainable management of land resources is vital for the economic and social well being of the country. Government responsibilities include preparing and adopting standards for sustainable land use, conservation, and providing advice to all land users, including farmers, on the sustainable use of land resources.

With the ongoing transition away from the sugar industry in St. Kitts, it is necessary to evaluate the suitability and quantity of land for proposed alternative activity. Thus, there is a need to develop good quality information showing the total and location of lands suitable for alternative uses including non-sugar agriculture, housing, national parks, conservation areas, tourism, commercial and industrial activity, and to be able to assess the vulnerability of valuable land resource as the sugar crop is diminished.

It is predicted that closure of the sugar cane industry will result in increased problems with land degradation due to an increase percent of abandoned lands and failure to contain soil conservation measures formed by the SSMC. The NAP therefore provides support for the development of strategies that will contribute to sustainable land management, in particular, and overall sustainable development, in general.

6.2 Tourism development

Tourism is highly dependent on the physical environment for its viability. Much of the attractiveness of St. Kitts and Nevis to tourists depends on the landscape aesthetics. With increased land degradation, income from tourism will decline and the reputation of St. Kitts and Nevis as a tourist destination would suffer and be expensive to rebuild. If left unchecked environmental degradation may result in a net reduction in the significance of St. Kitts and Nevis as a tourism destination. Conservative estimates suggest that environmental degradation and the associated impacts could lead to a 20% reduction in the tourism related revenues.

6.3 Expansion of non-sugar agriculture

Another significant contributor to the local economy is the agricultural sector. Any reduction in the productivity of agricultural land through land degradation, could reduce the value of that land and decrease the available options for alternative uses. Thus, the costs of repair and replacement could exceed the costs of protection. The significance of agricultural land losses will depend on the market for land, but on islands with limited land resources, it is likely to remain high.

6.4 Protection of potable water supplies

In addition, it is prudent to protect and conserve both surface and underground potable water sources on St. Kitts and Nevis. The cost of environmental protection of catchments to facilitate aquifer recharge, could result in lower water costs than those associated with alternative sources, such as desalination. The unit cost of desalinised water is typically in the order of ten times higher than that obtained from groundwater.

6.5 Squatting

Like other Caribbean countries, St. Kitts and Nevis is experiencing the phenomena known as "squatting". Squatter settlement areas in St. Kitts and Nevis are normally found outside formal settlement boundaries and jurisdictions but in some cases, within. Generally, they have some or all of the following interrelated characteristics: (a) unplanned growth resulting in, amongst other things, negative environmental health issues and environmental degradation; (b) tenure of residents is not always based on clearly defined and enforceable title; (c) planning and building guidelines and regulations, and provision of urban services are not applied; (d) service infrastructure is inadequate to meet even basic needs; (e) social infrastructure does not meet basic needs; and, (f) a significant proportion of residents are in lower income categories.

The key to managing the problem of "squatting" in St. Kitts and Nevis is to institutionalise a participatory and evolutionary approach towards settlement status and land tenure. Specific strategies to resolving the "squatting" problem include: (a) infrastructure delivery; (b) evolution of tenure from Crown Lands to individual ownership; and, (c) evolution of urban and rural settlement patterns and land management to that required under the Development Control and Planning Act, 2000.

These negative impacts of potential land degradation more than justifies the implementation of strategies proposed by this NAP. It is against this backdrop that GOSKN will implement sustainable land management programmes in the following six broad thematic areas: (a) public education and awareness; (b) institutional strengthening and coordination; (c) preparation, adoption and adoption of sustainable land management policies; (d) legislative reform; (e) site restoration and rehabilitation; and, (f) evaluation.

7.0 PURPOSE OF THE NATIONAL ACTION PROGRAMME

The United Nations Convention to Combat Desertification (UNCCD) requires all contracting Parties to prepare a National Action Programme (NAP). Article 10 of the UNCCD outlines the purposes of the NAP as:

1. To identify the factors contributing to desertification and practical measures necessary to combat desertification and mitigate the effects of drought.
2. To specify the respective roles of government, local communities and land users and the resources available and needed.
3. To include specific measures to prepare for and mitigate the effects of drought.
4. Based on the circumstances and requirements specific to the country, the national action programme should include, as appropriate, *inter alia*, the following priority strategies as they relate to combating desertification and mitigating the effects of drought in affected areas and to their populations:

    a) Promotion of alternative livelihoods and improvement of national economic environments with a view to strengthening programmes aimed at the eradication of poverty and at ensuring food security;
    b) Demographic dynamics;
    c) Sustainable management of natural resources;
    d) Sustainable agricultural practices;
    e) Development and efficient use of various energy sources;
    f) Institutional and legal frameworks;
    g) Strengthening of capabilities for assessment and systematic observation, including hydrological and meteorological services; and
    h) Capacity building, education and public awareness.

It is against the backdrop of the above that the *National Action Programme for Combating Desertification and Land Degradation in St. Kitts and Nevis (NAP)* was prepared. The NAP is a comprehensive and integrated framework for addressing the physical, biological and socio-economic aspects of the process of land degradation. Accordingly, the NAP integrates strategies for poverty reduction, sustainable land management, institutional collaboration and cooperation, and the creative sourcing of funds for combating land degradation at the national and community levels.

7.1 Audience for the National Action Programme

The National Action Programme is designed to guide corrective and preventative actions at the community and national levels in St Kitts and Nevis. All key stakeholders groups/agencies have significant roles in its implementation including government agencies, NGOs, local communities, developers and the business sector.

8.0 METHODOLOGIES USED IN THE PREPARATION OF THE NAP

Sustainable land management is a complex process that requires both formal and informal components of decision-making. Because of its intricate nature and the delicate balance that exists between humans and nature as well as government, non-government agencies and affected communities, the methodology for the preparation of the NAP set out to establish a framework for guiding development rather than try to impose rigid development patterns. The process therefore was interactive and involved discussion and meetings, collaboration and cooperation between different government agencies and various other groups such as the private sector, NGOs, CBOs, churches, special interest groups and the general public. In the final analysis, attempts were made to facilitate participation of local level communities in designing and implementing policies and strategies.

The following methodologies and strategies were utilized in the NAP preparation process:

- Public involvement through workshops, meetings etc.;
- Data collection: Collection of data so as to learn more about the causes of the problem and the possible solutions to land degradation.
- Data analysis: Data manipulation and processing to permit a full understanding of the conditions and relationships that exists between the various components of land degradation.
- Development of goals and objectives: A statement that hopefully reflects the overall demands and desires of the entire country. This process requires extensive policy reviews and public participation to ensure that all community views and values were fully considered.
- Clarification and diagnosis of the problem: Clarification of the problem and the environment, so that alternative solutions can be more responsive to the goals and objectives. The involvement of citizens was essential to understanding and defining the breadth of the problem.
- Analysis and evaluation of strategies: Comparing and measuring proposed strategiesso as to determine the effects or impacts on mitigating land degradation in terms of their physical, social, economic, fiscal, environmental or aesthetic implications for St. Kitts and Nevis was also a prerequisite.
- Development of implementation programme: Implementation of proposed strategies was incorporated as part of the NAP preparation process from the beginning. Indeed, consideration of this step was one of the primary safeguards against the preparation of an idealistic and unrealistic NAP. By involving the affected and interested parties in the setting of goals and objectives, defining alternatives, assessing their impacts and selecting the one for implementation, support for the selected action was generated among those who will be affected and responsible for the plan, thereby increasing assurance of the plan success.
- Consultation with relevant public agencies, interest groups and community organizations was initiated at strategic stages of the NAP preparation exercise.
- Monitoring feedback and review: Once the plan is operational, there is a continuous need to scrutinize the way in which it is working. Monitoring will determine what has

occurred as a result of plan implementation and how well such results conform to the goals and objectives that were identified during the planning and preparatory process.

The adoption of these critical strategies will ensure an endless re-cycling of the NAP implementation process.

PART THREE: THE STRATEGY

9.0 KEY ELEMENTS OF THE ST. KITTS AND NEVIS NATIONAL ACTION PROGRAMME

The St. Kitts and Nevis National Action Programme should be undertaken in two phases. Phase 1 will establish some quantitative baseline data on land degradation and initiate capacity development to address priority land degradation issues. Phase 2 will be developed after Phase 1 is completed and will be based on the outcome of the Phase 1 actions.

9.1 Vision

While this NAP maps out goals and strategies for improved efficiencies and effectiveness of land use planning on St. Kitts and Nevis over the next fifteen (15) years, it has an even longer term vision about the kind of development that GOSKN would like to see occur in St. Kitts and Nevis in the distant future. The vision is captured in the following five statements:

Vision Statement #1:

Programmes and projects will emphasize popular participation or will be "people-led" in order to promote ownership among communities and enhance their execution and sustainability.

Vision Statement #2:

Adequate attention will be paid to watershed and coastal protection in the development planning process.

Vision Statement #3:

The development of low impact tourism will be encouraged to minimize the environmental and socio-cultural impact of tourism.

Vision Statement #4:

Areas of outstanding natural beauty, of biological and geological significance and of historical and cultural importance will receive protected status that will ensure their continued use.

Vision Statement #5:

Developmental planning and control activities will be coordinated through the building of partnerships between the various stakeholders and government to ensure development and economic growth on a sustainable basis.

9.2 Goals and Objectives

At the outset, the GOSKN is seeking to ensure that utilization of natural resources and the environment today does not damage prospects for their use by the present and future generations.

Thus, consideration has been given to specific parameters with regards to influencing the nature and direction of future development thrusts on St. Kitts and Nevis. These include, but are not limited to, an acknowledgement of the need:

- To decrease exploitation and stress on natural resources;
- To ensure that socio-economic development improves the quality of life of citizens;
- To harmoniously link economic development goals and strategies with those of environmental protection and conservation, and hazard mitigation; and,
- To seek the inputs of as many stakeholders as possible, including the ordinary person on the street, environmentalists and other special interest groups, non-governmental organizations, the private sector, various government agencies, policy formulators and residents of all communities.

The 2006 NAP has been prepared in order to provide an overall strategic planning framework to ensure wise and efficient sustainable land management decisions in the country over the next fifteen year period. The framework is intended:

- To provide a framework for the orderly and progressive development of land in the Federation; and,
- To devise appropriate measures that ensure sustainable livelihoods.

The objectives of Phase 1 of the St. Kitts and Nevis National Action Programme are:

1. To improve national awareness on land degradation and its impact on socio-economic development;
2. To promote consistent and participatory action to address the factors causing land degradation;
3. To develop local capacity to prevent land degradation and to manage degraded landscapes and other issues related to land degradation.

9.3 Critical Actions

The following nine priority actions are critical to the successful implementation of the NAP, since they will lead to significant changes on the ground or because they are the first steps in combating particularly challenging land degradation issues. These actions are as follows:

1. Establishment of a public education and awareness programme.
2. Strengthening of planning and environmental regulation and enforcement support Structures.
3. Adoption and implementation of the 2006 National Physical Development Plan.
4. Regularisation of squatter residential communities and squatter agricultural lands.
5. Preparation of minimum standards for quarrying activities.
6. Establishment of an effective institutional framework for the integrated management of the country's potable water resources.
7. Establishment of the Land Management Unit to ensure soil conservation.

8. Establish a unified real estate registration system through the creation of a sound land registration and cadastre system

PART FOUR: IMPLEMENTATION PLAN

10.0 STEERING COMMITTEE AND COMMUNITY PARTICIPATION

The NAP is a comprehensive programme which requires the State and its partners to take a multi-disciplinary approach to its implementation in order to achieve its objectives. Several organisations are expected to be engaged in the planning and implementation of projects, programmes and actions and these include the NGO and community sector, including environmental groups, women and youth groups; private sector stakeholders, such as private enterprise associations; and central and local Government agencies. The National Focal Point for the Convention, the Ministry of Public Utilities and the Environment (MPUE) will be responsible for coordinating the implementation of the NAP. The St. Christopher Heritage Society (SCHS) will be the focal point for the dissemination of information and actions for the NGO and community sector and be an integral part of the national decision-making process for the implementation of the NAP.

The following methodologies and strategies are recommended for implementation of the NAP:

1. **Appointment of a Steering Committee:** The National Capacity Self Assessment (NCSA) Project Committee will serve as the Steering Committee (SC). Membership will be comprised of representatives from the following agencies/organisations:

   - Department of Agriculture, Nevis;
   - Department of Physical Planning, Natural Resources and Environment, Nevis;
   - Fisheries Department, Nevis;
   - Nevis Historical and Conservation Society, Nevis;
   - Department of Agriculture, St. Kitts;
   - Customs Department, St. Kitts;
   - Department of Maritime Affairs, St. Kitts;
   - Tourism Authority, St. Kitts;
   - Ministry of Sustainable Development, St. Kitts;
   - Solid Waste Management Corporation, St. Kitts;
   - St. Christopher Heritage Society, St. Kitts;
   - St. Kitts Sugar Manufacturing Corporation, St. Kitts;
   - Fisheries Management Unit, St. Kitts;
   - Department of Social Development, St. Kitts;
   - UNFCCC National Focal Point;
   - UNCCD National Focal Point; and,
   - CBD National Focal Point.

   Its primary functions will include the formulation of goals and objectives, providing policy guidance, and serving as the coordinating authority to ensure and guide the participation of government sectoral representatives and NGOs. Its functions are outlined as follows:

   a) Assist in formulation of NAP goals and objectives.
   b) Provide occasional policy guidance.

c) Serve as a coordinating authority to ensure and guide the participation of government sectoral representatives in the NAP implementation exercise.
d) Provide guidance on priority development initiatives and likely financial flows in respect of priority programmes.

2. **Community participation**: Community involvement and coordination with various stakeholder groups through community consultations and workshops.

11.0 MAIN POLICY INTERVENTIONS BASED ON UNCCD THEMES

11.1 Theme 1: Participatory Processes

11.1.1 Improve the opportunities for working together in partnership

Issue

SLM in St. Kitts and Nevis can best be achieved through business, civil society and Government working together in partnerships to address and identify common aims. Whilst there is a recognition that Government will lead in SLM it has neither the assets nor attributes to deliver on its own. Future SLM activities in St. Kitts and Nevis requires strong and effective links and cooperation between Government, the private sector and civil society. The small population and small absolute numbers of civil servants means that knowledge and expertise on any particular SLM issue does not reside solely in Government, nor could it be expected to. Working together to a common agenda, and having effective opportunities for debate and discussion where those agendas do not match is essential. Representatives of local small businesses, the Chamber of Industry and Commerce, Hotel Association, SCHS, NCHS, churches, unions, fishermen, farmers, educators, scientists, economists, media and civil servants should be involved in the process.

Given the limited land resources, competition among several uses and need for protection and conservation of critical landscapes, a wider cross section of stakeholders have secondary interests in sustainable land management. The tourism industry, housing sector, livestock farmers and quarry operators have the largest demand for and impact on land resources. As such they must be involved in the formulation and implementation of strategies geared towards achieving SLM.

Strategy

The following strategies are proposed:

a) Provide clear guidelines for environmental management or rehabilitation in land leasing arrangements. An example is the case of quarries;
b) Introduce community management of open land spaces used for pasturing in the Federation;
c) Consult community farmers and private sector developers in order to develop a land leasing system with provisions for co-management;
d) Provide training in pasture management, animal husbandry, quarry development, management and rehabilitation;
e) Involve livestock farmers in addressing the problems associated with overgrazing and land degradation through active research to identify their perception of the problem and devise workable strategies for solving them. Their involvement from the design stage is important to ensure cooperation, ownership and successful implementation;

f) Involve the St. Christopher Historical Society in the implementation of initiatives for civil society participation in sustainable land management. This St. Kitts-based NGO takes an active role in projects related to environmental management and protection;
g) Engage colleges and other educational institutions on St. Kitts and Nevis to assist in addressing the nuisances caused by the over-population of monkeys;
h) Identify umbrella bodies and stakeholder groups in St. Kitts and Nevis and develop clear consultation mechanisms for policy-making;
i) Independently monitor Government's performance against the provisions of the NAP; and,
j) Increase public awareness of SLM issues.

11.1.2 Public education and awareness

Issue

Without understanding of the processes and practices that turn land into desert or, at least, turn it into unproductive wasteland, there will be very limited support for the difficult measures that will have to be taken to halt the processes of land degradation that are increasingly at work in St. Kitts and Nevis. Stopping the degradation is only the first step towards rehabilitation and will require strong public support.

Strategy

Accordingly, the following public education and awareness strategy is proposed:

a) Schools will be targeted by both the public and private sector as well as the NGO community to educate the youth about the processes of land degradation on St. Kitts and Nevis. Additionally, the school curriculum on the environment will be enhanced by focusing on natural history as well as ecosystem and biodiversity issues.
b) Tailor special programmes for adults by relating land degradation concerns to economic and livelihood development.
c) Specific target groups (for e.g., those who cut wood for charcoal or fish pots, those who operate backhoes for land clearing, farmers who set fires without any care for where the fire goes) will receive special awareness building and sensitivity training.
d) Appropriate pieces of legislation will be strengthened and upgraded.
e) Establish collaboration with other UN Environmental Conventions (particularly, Biodiversity and Climate Change).

11.2 Theme 2: Legislative and institutional frameworks

11.2.1 Improving the coordination, collaboration and effectiveness of Steering Committee

Issue

There is a critical need to ensure that the NAP becomes the overarching framework within which to make balanced policy decisions regarding sustainable land management. The strengthening of

the role of the Steering Committee will avoid addressing long-term land degradation issues through short-term "quick fixes"; instead identifying win-win scenarios which meet environmental, social and economic needs. Additionally, a strong Steering Committee would serve to embed sustainable land management objectives in the Government decision-making process.

Strategy

The strengthening of the role of the Steering Committee would:

a) monitor delivery of Government's SLM strategy generally and this NAP specifically;
b) appraise the impact on Government's SLM of proposed public and private sector development initiatives;
c) maintain an awareness of best practice in SLM strategies and the use of SLM indicators;
d) create links between departments and with external organizations;
e) audit existing activity in each sector;
f) identify key issues and barriers to action;
g) identify resources, both human and financial;
h) engage non-governmental actors in the decision-making process;
i) develop, in conjunction with ministries, potential solutions for new initiatives and projects or where SLM indicators show unsustainable trends in existing projects;
j) communicate and facilitate SLM across Government, embedding principles and actions in the strategic and operational planning of line ministries.

11.2.2 Institutional strengthening

Issue

Current institutional capacity is inadequate to both monitor the status of land degradation on a routine basis and to implement the measures needed to curb existing degradation and to rehabilitate already degraded lands.

Strategy

Against this backdrop, the NAP proposes the following strategies:

a) Develop the human resource capacities needed for sustainable land management (SLM) by training the staff of the DPPE, DLS and MOA on the island of St. Kitts and the PPNRE and MOA of Nevis in satellite imagery interpretation and GIS and to use it for monitoring and/or analyses related to SLM.
b) Establish a Land Management Unit (LMU) within a reconstituted and expanded Department of Lands and Surveys with the responsibility for soil conservation and road infrastructure management.
c) Identify and source equipment and resources needed for the LMU.
d) Develop a regulatory framework for the proposed LMU.

e) Identify mechanisms for inter-sectoral collaboration between the Ministries of Agriculture, Sustainable Development and Tourism as well as between the public and private sectors and the NGO community.
f) Train appropriate technical staff in the use of satellite imagery and GIS for SLM as follows:

   i. Staff of DPPE and PPNRE trained in satellite imagery and remote sensing;
   ii. Staff of DPPE and DLS trained in the maintenance of GIS data and the preparation of Land Use maps;
   iii. Other agencies trained in background and usage of land map and GIS databases;
   iv. Staff at the Land Registry trained in maintenance of registry and associated instruments;
   v. Staff of Inland Revenue Department taught how to integrate aerial statistics and GIS into their taxation calculations; and,
   vi. Decision makers made aware of National GIS and how to make the best use of it to support future planning.

g) Train Ministry of Sustainable Development officials in environmental and natural resource economics.
h) Train environmental officers, police officers and the judiciary on environmental legislation.
i) Train persons in the development of programmes/activities that target poverty reduction.
j) Vest overall responsibility for future SLM in the Ministry of Sustainable Development. Therefore, the head of the proposed Land Management Unit whilst responsible for management of the LMU should report to the Permanent Secretary of the Ministry of Sustainable Development. Experienced institutions and personnel of the DPPE and the DLS should provide technical support. Staff should be recruited, and an office base established in offices previously occupied by the SSMC. Planning strategic objectives, developing procedures, conducting baseline surveys and workplan preparation, should be conducted, and an individual training plan for each staff member put in place.
k) Harmonize the roles of the three lead agencies (DPPE, DLS and DOA) to facilitate the establishment of the Land Management Unit and development of the St. Kitts Integrated Land System (SKILS). The DPPE and the DLS are already within the Ministry of Sustainable Development, which should allow for an ease in collaboration at the policy and institutional levels. The DPPE already has GIS capability which must be enhanced to allow for the development of a legal cadastre and comprehensive Land Registry.
l) Continue the soil conservation and environmental protection functions previously undertaken by the SSMC. This means that the DOA will play a key role in future land management schemes. It will be necessary to revise, update and adopt the soil conservation manual developed by the SSMC for wider application and dissemination.

11.2.3 Effective enforcement of environmental and planning legislation

Issue

Throughout the Federation of St. Kitts and Nevis there seem to be little respect for environmental and planning legislation. As a result, crimes against the environment are generally not taken seriously. This has significant implications with respect to the arresting of actions that contribute to land degradation. Therefore, this NAP proposes to improve the enforcement of planning and environmental legislation with the view of increasing successful prosecutions of environmental and planning violations.

In 2004, Government merged the Physical Planning Division and the Department of Environment into a single agency. The new Department of Physical Planning and Environment (DPPE) is housed within the new Ministry of Sustainable Development. This merger has brought together enforcement resources from both departments. The creation of the DPPE is seen as a significant statement of commitment to action and is expected to strengthen environmental and planning enforcement. Apart from a reduction in illegal activity and lawlessness, improved enforcement could also result in significant revenue generation, much like parking and speeding enforcement.

Strategy

The way forward is to:

a) amend the Summary Offences Act to allow for on the spot ticketing of environmental and planning infractions by enforcement officers of the DPPE;
b) develop and deliver training courses in expeditious enforcement of environmental and planning legislation; and,
c) update existing environmental and planning legislation to increase fines and deterrents to breaches.

11.3 Theme 3: Resource mobilization and coordination

11.3.1 Financing the NAP

Issue

Strategy

Funding for the NAP will, for the most part, be derived from grants provided to St. Kitts and Nevis as a party to the UNCCD by the Global Environment Facility (GEF) and the Global Mechanism (GM) as well as the annual budget of participating government agencies, and private sector contributions as follows:

d) Funding mechanism by the GEF and GM as the UNCCD is related to other conventions such as the CBD and UNFCCC;
e) Establishment of a transparent private sector "Green Fund" toward wider environmental protection; and,
f) Allocations within the national budget for NAP implementation.

11.3.2 Partnership with private sector

Issue

Government will collaborate with its private sector partners to develop a flexible checklist of specific positive actions (with a range of options) promoting sustainable land management which could be considered to constitute a "Corporate Responsibility Programme". Each action would garner an agreed number of "Corporate Responsibility Points" which would be used to determine the level of fiscal concessions offered to a particular company. Participating companies would be recognized and rewarded. With a lengthy list of options, weighted appropriately, companies would be able to choose the appropriate option for their circumstances, ensuring maximum flexibility. The maximum number of points available will be 100, with 50 points considered good, 25 – average and 10 – poor. Other incentives used would include reduced planning fees, work permit fees and customs duties.

Strategy

Suggested items to include on the checklist are as follows:

- Developing clear standards for corporate giving such as the donation of a standard percentage of their annual profits or give "in-kind" support to land rehabilitation projects.
- Having in place sustainable development plans for expansion of their businesses or the construction of new projects;
- Conducting environmental audits for energy and water usage and waste production, developing programmes for reducing energy and water use, using renewable energy sources and minimizing waste. This not only offers businesses opportunities in sustainable land management but could be used to raise the level of awareness amongst employees.

11.4 Theme 4: Synergies to achieve the UNCCD's mission

11.4.1 Adoption and implementation of the 2006 National Physical Development Plan

Issue

Land management is largely the responsibility of the Ministry of Sustainable Development on the island of St. Kitts, and the Ministry of Communications and Works, Physical Planning, Natural Resources and Environment on the island of Nevis. Effective land use management will require the adoption and implementation of the 2006 NPDP which details well-planned measures for land policy and administration.

Strategy

This NAP proposes that interventions in the land use management area be implemented under the three areas of land use planning, watershed management, management of protected areas and coastal area management, as follows:

Land use planning

a) Pursue integrated planning and management of land resources with a view to protecting the productive capabilities and natural resources of land in urban and rural regions;
b) Establish a Land Management Unit, within a reconstituted Department of Lands and Surveys, to undertake the environmental management and infrastructure maintenance responsibilities of the former SSMC.
c) Ensure that residential densities within the island of St. Kitts are consistent with the density ranges designated by the Land Use Code and the Future Land Use Management Plan;
d) Upgrade the Geographic Information System (GIS) housed in the Department of Physical Planning and Environment to a Land Information System (LIS);
e) Establish a unified real estate registration system through the creation of a sound land registration and cadastre system;
f) Establish a Land Registry with primary responsibility for registration that will set up an automated parcel-based registration system linking parcel maps and identification data, speed up and simplify procedures, and move toward reform in property valuation; and,
g) Prepare and adopt a Land Use Code that provides the rules and processes to carry out the NPDP policies and proposals including, but not limited to, zoning districts defining uses and their intensities, the process for subdivisions, site plan review, development standards, and other land use procedures.

Watershed management

a) Implement a comprehensive reforestation programme.
b) Enforce laws prohibiting unauthorised nature tours in forest reserves and water catchment areas.
c) Develop public awareness programmes geared toward the understanding of forests, particularly with regard to soil and water conservation.
d) Declare the following large upper watershed areas, which are suitable for sustained production of water, wood products, wildlife, forage and for soil conservation, outdoor recreation and educational use, as protected areas:
    i. Wingfield catchment;
    ii. Frankland's catchment;
    iii. Stonefort catchment;
    iv. Greenhill catchment;
    v. Phillips catchment; and,
    vi. Lodge catchment.

Management of protected areas

a) Develop a Parks and Protected Areas Systems Plan so as to ensure that all critical natural and cultural resources receive adequate protection and management.
b) Designate the Mount Liamuiga Central Range for nature tourism and domestic recreational facilities under protection as a National Park. Possible developments may include a hiking trail system, provision for shelters, and implementation of an educational programme.
c) Restrict development on the Basseterre Valley aquifer, especially as it is being used to provide a major portion of the acceptable potable water in St. Kitts.
d) Establish procedures to facilitate and promote community-based actions with regards to conservation of the natural environment thereby ensuring that citizen concerns are properly addressed.

Coastal area management

a) Prepare a comprehensive Coastal Zone Management Plan.
b) Implement a long-term coastal water quality and marine biological monitoring programme in order to gather baseline data, determine the impacts of liquid waste disposal in urban areas and at industrial sites, and identify areas requiring remedial actions.
c) Establish and enforce effective standards to control the discharge of effluents into drainage systems, sensitive potable water zones and marine areas.
d) Protect and sustain long term use of mangroves, sea grass beds, coral reefs, ponds and beaches.
e) Designate the South-east Peninsula and the Sandy Shoal coral reef as marine protected areas.
f) Establish designated mooring areas for dive boats, yachts, and cruise vessels.

11.4.2 Establishment of a Land Management Unit

Issue

The majority of sugar cane on St. Kitts is grown on soils developed on deep volcanic ash, giving rise to young soils that are coarse textured and often gravely. They occupy the glacis slopes and apron of the newer volcanic centres between 1000 feet and sea level. Around 80 percent of sugar cane is grown on land exceeding a 10 percent slope. If exposed, the soils of St. Kitts are inherently vulnerable to erosion. Soil erosion is a particularly critical issue that can adversely impact the former sugar lands on St. Kitts. The vulnerability of the soils to erosion results from their course textures and structureless, unconsolidated nature, combined with a distribution on the long slopes, exceeding 10 percent.

Observations at several sites around the island suggest that, even on gentle slopes of around 5 percent, the critical combination of the removal of sugar cane cover; the encroachment of livestock, and high intensity rainfall events, can rapidly lead to major gully erosion in areas that were previously considered stable. However, over the years, sugar has protected the best

agricultural areas of St. Kitts from soil erosion, and facilitated the infiltration of intercepted rainfall for generations.

Soil and water conservation measures on Saint Kitts are essential to:

- Maintain agricultural productivity;
- Protect the built environment and other infrastructure near *ghauts*, and
- Safeguard the railway system.

The main center of soil conservation expertise on the island of St. Kitts is the SSMC. Currently, SSMC has responsibility for soil conservation; the maintenance of the road network, culverts, bridges, and drainage within the sugar estate. SSMC responsibilities also extend beyond the perimeter of the immediate sugar cane area, particularly in the case of *ghaut* stabilization, and also for the maintenance of firebreaks between cane fields and adjacent housing areas.

The FAO/CDB Agricultural Diversification Project Preparation Report of 2002 makes reference to the likely environmental damage that might occur following closure of the sugar industry with the interruption of the soil conservation and environmental activities carried out by the sugar industry. Therefore, the FAO/CDB proposed the establishment of a Land Management Unit (LMU).

Strategy

Some of the critical environmental conservation activities to be carried out by the proposed LMU include:

a) *Soil conservation* – maintaining vegetation cover to protect and prevent topsoil loss, contouring, strip cropping, terracing and minimum tillage;
b) *Drainage structures* – construction and maintenance of sluices, cross drains, culverts, grass water ways thereby limiting follows of water that would destroy roads and threatened land settlement areas;
c) *Feeder road maintenance* – to keep roads passable and to avoid roads becoming deep gullies;
d) *Ghaut stabilization* – including the construction and maintenance of gabion structures and embankments;
e) *Control of fires* – to avoid destruction of crops, other vegetation and adjacent properties; and,
f) *Moisture conservation* – to maintain crop cover, minimize run off and allow recharging of aquifer.

The focus of these activities would be to create conditions for environmental stability, foster agricultural development and sustainability while protecting vulnerable housing settlements and infrastructure.

11.4.3 Implementation of the National Environmental Management Strategy

Issue

As a matter of policy, Government needs to ensure that the National Environmental Management Strategy (NEMS) becomes the blueprint for conservation in St. Kitts and Nevis. The NEMS was developed by people from all sectors of the community and describes the role that stakeholders can take to conserve the country's rich natural heritage. It identifies actions (solutions), relevant agencies, time-frames and estimates costs and outputs of the main threats to biodiversity and land degradation including invasive species, development, pollution, habitat destruction and lack of awareness.

11.5 Theme 5: Early warning systems for drought mitigation and land rehabilitation

11.5.1 Drought management

Issue

Drought is one of the leading factors that predispose the South-east Peninsula on St. Kitts, and most lands on the island of Nevis, to degradation. In these areas, the prevailing rainfall pattern causes the vegetation to experience drought stress for several months of the year. This limits the vegetative stand and the protective cover it provides the soil. When intense rain falls in these areas, it leads to soil erosion, especially where the land has already been degraded by overgrazing.

Strategy

Planning for drought will require adoption of the following strategies:

a) Establishment of an advanced early warning system for drought on the island of Nevis;
b) Preparation and adoption of drought mitigation measures such as water use restrictions and the adjustment of stock levels; and,
c) Establishment of a Drought Management Committee within the Department of Agriculture to oversee the Drought Alert System.

11.5.2 Planting of native and endemic species to rehabilitate degraded lands

Issue

There are a few upland watersheds that have been damaged by a number of recent tropical storms.

Strategy

This NAP proposes that these areas be re-vegetated with native and endemic tree species. A number of private quarry sites on the island of Nevis also need to be recovered in this way.

Additionally, new developments will be required to plant native and endemic species as part of their landscaping systems. The intention is to, as far as possible, avoid compromised ecological systems brought about by the importation of invasive species. The rehabilitation of some of the native habitats means that government and private nurseries will need to increase the stock levels of native and endemic species.

11.6 Theme 6: Access to appropriate technology, knowledge and know-how

11.6.1 Land Resource Analysis Project

The Land Resource Analysis Project would help integrate existing information into a GIS to inform the decision-making process. The analysis for sustainable land management would entail the use of environmental, elevation, hydrology, soil and topography criteria to identify the most suitable land for a variety of alternative uses. The results could then be compared with the economic and social goals of the government's transition plan and will be used to develop a strategy, area by area, of the best long term land uses.

Expected results and outputs of the project will include maps and statistics on the feasibility and suitability of alternative land uses; information on the vulnerability of land to soil erosion after removal of sugar including ghaut management and analysis of downstream effects on infrastructure, in particular for rail and roads, buildings and to the marine environment. The baseline data developed will be installed in the centrally-located GIS at the DPPE for the use of other stakeholders who will be trained in the use of the system.

11.6.2 St. Kitts Integrated Land System (SKILS) Project

The SKILS Project will target key stakeholders. Primarily, it will feed quality information to decision makers in government, Ministers, Permanent Secretaries and Department Heads to help them make day-to-day and strategic decisions. It will also provide useful monitoring, evaluation and reporting information both at a national level and to support multilateral agreements. Secondly, it will aid civil servants in each of the stakeholder departments, as it will more clearly define the needs for information and streamline the methods for bringing that data together. Finally, it will assist all citizens because it will show good governance in valuing their rights of land ownership and derive a fair tax revenue system.

The expected outputs and results of the project will include training for both technical staff and decision makers along with establishment of:

i) *National GIS Framework* – to coordinate and standardize the management of spatial information;
ii) *Land Cadastral Map* – showing parcel boundaries and identification number. Where possible, the nature of boundaries will be established, and an updating methodology derived;
iii) *Land Ownership Database* – showing, for each parcel, the ownership, leasehold and other instruments of land holding. A fully historical database can be made showing discharges and resale, as well as any mutations to the parcels (subdivision, boundary

disputes); iv) *Land Taxation System* – using the aerial calculation from the cadastre and summarizing based on each land owner, the system will define the amount of tax payable, and keep track of dues; v) *Land Use Map* - a fully annotated land use map that assists physical planning and strategic development as well as agricultural, environmental and forestry applications. It will be based on an internationally recognized classification system but will be sensitized to national needs.

11.6.3 Alternative energy policy

Issue

If St. Kitts and Nevis is to maintain its high standard of living, consumption patterns must become more sustainable. At the moment, energy consumption levels are rising. St. Kitts and Nevis must prepare for possible future shortages and the inevitable rising prices of imported fossil fuels by developing and adopting appropriate alternative energy systems now. In turn, this will reduce both capital outflow and negative impacts on air and water quality.

A strong economy and increased development have resulted in higher electricity consumption. Global oil prices continue to rise, driving inflation and affecting the balance of payments. Yet, in real terms, oil is cheaper today than in 1980. This means that, for the moment, there is little economic incentive to invest in renewable sources, even though the burning of fossil fuels has been strongly linked to global climate change.

Strategy

Against the backdrop of the foregoing, this NAP proposes the following actions:

a) Establishment of an Energy Unit within Government to ensure coordination on energy issues resulting in reduced fossil fuel use, increased self-sufficiency, energy efficiency and a secure energy supply;
b) Amending the Building Code to ensure the use of energy efficient measures including lighting, outer cladding of window glass to reduce heat, the use of solar thermal panels, the use of air-to-water heat pumps for residential water heating and swimming pool heating, photovoltaic power and geothermal energy, in new buildings and the retro-fitting of existing buildings;
c) Requiring the Electricity Department, though legislation, to generate an agreed percentage of electricity needs from renewable sources by 2015;
d) Providing duty free relief on solar panels and associated equipment;
e) Making legislative provisions for reverse metering so that households and businesses can sell surplus energy back to the national Grid;
f) Making legislative provisions for distributed generation to enable large developments, such as hotels, to develop on-site energy sources, with a strong pre-disposition towards renewable energy sources;
g) Restricting the importation of energy-inefficient and offer further import duty breaks on highly energy-efficient goods;
h) Instituting a Government energy-efficiency programme to reduce energy use in

Government buildings; and,

i) Undertaking a public education campaign to reduce extravagant energy consumption.

TABLE 9: MATRIX OF ACTIVITIES TO COMBAT LAND DEGRADATION IN ST KITTS AND NEVIS

THEMATIC AREA	ACTIVITIES	PARTICIPATING AGENCIES	OUTPUTS	BUDGET ($ U.S.)
Public Awareness	1. Conduct an evaluation of previous awareness and environmental education programmes/activities. 2. Recruit or train suitable staff and dedicate to delivery of the NAP public awareness programme. 3. Develop TOR for the evaluation. 4. Recruit consultant to determine effectiveness of previous activities. 5. Utilise recommendations to develop new awareness programme on land degradation and soil conservation. 6. Select staff for training in awareness building. 7. Awareness building work plan developed and awareness activities initiated. 8. Conduct stakeholder consultations and training workshops on land degradation, soil conservation and best practices.	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications and Works, Physical Planning, Natural Resources and Environment (Nevis) • MOF • CIC • Department of Education • CFB College • Radio Stations • Relevant NGOs & CBOs • Newspapers • SKNIS • NEMA	1. Develop an awareness programme on land degradation and other environmental issues. Package the information appropriate to key stakeholder groups such as the Judiciary, Government Ministers, Heads of Departments and senior officers, Quarry Operators, Land Developers, Law Enforcement Officers, farmers, etc.	$60,000
Institutional Strengthening and Coordination	1. Develop TOR for NAP Coordination Committee. 2. Identify and appoint committee members. 3. Develop TOR for NAP Project Coordinator. 4. Recruit suitable candidate as NAP Project Coordinator. 5. Establish NAP Coordinating Unit within the Ministry. 8. Furnish and equip the NAP Coordinating Unit. 9. Establish a Land Management Unit within the Ministry of Sustainable Development and develop the necessary regulatory framework for its operations. 10. Review and harmonize responsibilities for land management. 11. Conduct training in the use of satellite imagery interpretation and GIS. 12. Train persons in the development of programmes that target poverty reduction.	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications and Works, Physical Planning, Natural Resources and Environment (Nevis) • MOF • DOA • WSD • DOE • DEH • NEMA • Relevant NGOs & CBOs • CIC	1. Establish Cabinet appointed multi-sectoral committee to coordinate the development and implementation of the NAP in both islands. 2. Strengthen the lead institution to implement the NAP, through the provision of additional staff, equipment, and other resources.	$220,000
Policy Formulation	1. Conduct a policy analysis to determine the impacts of existing policies on land degradation. 2. Conduct annual review of policy implementation	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications	1. Develop new policy or amend existing policies as appropriate to facilitate the	$40,000

	related to land degradation. 3. Develop TOR for policy analysis. 4. Recruit consultant to conduct policy analysis. 5. Host public consultations on the results of the policy analysis. 6. Use recommendations and public comments to develop or amend policies. 7. Develop procedure for annual review of policy. 8. Identify and get agreement of key senior personnel to lead policy review. 9. Conduct land resource analysis project. 10. Develop a compensatory mechanism/economic incentive for investment in SLM. 11. Identify priority SLM needs and opportunities. 12. Develop a costed SLM investment plan. 13. Complete the Nevis NPDP.	and Works, Physical Planning, Natural Resources and Environment (Nevis) • MOF • DOA • WSD • DOE • DEH • DCPB • Legal Department • Relevant NGOs & CBOs • CIC	reduction in land degradation.	
Legislative Reform	1. Train existing enforcement officers within the Police service and other government agencies to improve their ability to respond to land degradation infringements. 2. Develop TOR for legislation review. 3. Recruit consultant. 4. Draft and enact new Quarry Act for SKN. 5. Host public consultation on draft legislation. 6. Finalise draft legislation based on comments from stakeholders. 7. Develop training module on enforcement with respect to land degradation infringements. 8. Identify enforcement officers for training. 9. Conduct in-house training sessions every 6 months.	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications and Works, Physical Planning, Natural Resources and Environment (Nevis) • Attorney General and Ministry of Justice and Legal Affairs • CIC • Relevant NGOs & CBOs	1. Revise existing legislation and draft relevant regulations so that the UNCCD will have effect in local law.	$50,000
Site Restoration and Rehabilitation	1. Identify key agencies/NGOs/CBOs for implementation of the management plans and build their capacity to adequately carry out the required actions. 2. Implement at least two site management plans. 3. Engage key stakeholders in planning for rehabilitation of priority sites. 4. Develop criteria and procedure for identification of sites for rehabilitation. 5. Identify capacity needs among these stakeholders and provide capacity development assistance. 6. Identify of sites for priority attention and collect	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications and Works, Physical Planning, Natural Resources and Environment (Nevis) • MOF • DOA • WSD • DOE • DEH	1.Identify sites for rehabilitation and develop site management plans specific to each site through a multi-stakeholder participatory process.	$110,000

	baseline data. 7. Develop and initiate at least two participatory site management plans. 8. Develop regulations for operations, management and rehabilitation of lands. 9. Conduct training in soil conservation and land management practices.	• DCPB • Legal Department • PWD • Relevant NGOs & CBOs • CIC		
Evaluation	1. Develop TOR for the evaluation. 2. Recruit consultant. 3. Host public consultations on the results of the evaluation and to plan for a new NAP. 4. Host further consultations in the preparation and finalization of the new NAP.	• Ministry of Sustainable Development (St. Kitts) • Ministry of Communications and Works, Physical Planning, Natural Resources and Environment (Nevis) • Relevant NGOs & CBOs	1. Conduct an independent evaluation of the implementation of this action programme. 2. Prepare a new national action programme based on the results of the evaluation and other emerging land degradation issues.	$20,000
TOTAL ESTIMATED COSTS				**$500,000**

The matrix above summarises the proposed activities consistent with the NAP objectives and are expected to be implemented over the first 5 years. At the end of this five-year programme, an independent evaluation will be conducted to assist in the preparation of a new ten-year national action programme (Phase 2). Phase 2 activities will essentially focus on the preparation, adoption and implementation of a coastal zone management plan, a watershed management plan, a national parks system plan and a drought risk reduction strategy.

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2.11.4 Policies and proposals

The following actions will be taken by GOSKN to strengthen the agricultural sector:

Crops

- Make ground and surface water available for agricultural development at potential sites including Molineux/Phillips and Green Hill/St. Peters.

- Strengthen the Marketing Unit within the Department of Agriculture thereby enabling it to develop mechanisms for coordinating the delivery of agricultural produce to major outlets including hotels and supermarkets.

- Ensure that the optimum use and proper management of good quality agricultural lands is practised in order to stimulate production for domestic and export purposes.

- Diversify agriculture through the introduction of new crops, inter-cropping and other methods.

- Introduce incentives to encourage youth, disabled, elderly and women in entrepreneurship involvement.

- Strengthen the development of marketing and agro-processing by:

    - Development of an appropriate marketing system;
    - Upgrading the Needsmust processing plant to a packing house facility;
    - Development of an action plan for agro-processing;
    - Training of technical staff and farmers in agro-processing methods and technologies.

- Stimulate domestic production and exports.

- Develop and implement conservation oriented farming technologies specifically adapted to local conditions.

- Promote land-use and land capability data to assist in decision making with respect to the implementation of agricultural development projects.

- Ensure that the utilization of agro-chemicals does not impair environmental quality.

- Provide supporting infrastructure for agricultural development.

- Train farmers in improved agronomic practices, post-harvest technology, farm management, good agricultural practices (GAPS), integrated pest management, irrigation and soil conservation.

- Promote the adoption of new and appropriate technologies such as the utilization of plastic mulch and the development of green houses.

- Work closely with the private sector so as to facilitate the development of agro-processing enterprises. Technical support would be provided to persons in the cottage industry so as to further develop the processing of local products.

- Encourage and support fledging farmer organizations thereby developing and improving management of these groups.

- Continue to provide farmers with inputs and seedlings at an affordable cost.

- Ensure collaboration between the Department of Agriculture and the Ministry of Sustainable Development in the implementation of an island tree planting programme.

- Encourage farmers to fence their plots to minimize the problem of stray animals.

- Reserve lands between the 500 – 1,000 ft. contour as priority areas for agricultural diversification activities.

Livestock

- Encourage the establishment of cattle farms in Con Phipps, Tabernacle, Belle Vue and Estridge Estate. Further, there are lands within the proposed White Gate Development Project that are intended to be allocated to agriculture and can be used for cattle production. These areas are ideal because water is available. In general, the lands that are allocated for livestock production should be between the 500 - 1000 foot contours.

- Encourage the establishment of small ruminant production in the following areas:

    - West Farm;
    - Challengers/Stonefort;
    - Lamberts;
    - Con Phipps Estate;
    - Whitegate;
    - St. Peters;
    - Olivees;
    - Farms and Bourkes Estates;
    - Estridge Estate;
    - Brighton Estate; and,
    - Phillips.

- Encourage the establishment of piggeries in the following areas:

    - Belle Vue Estate;
    - Stapleton Estate;
    - La Valle Estate;
    - Needmust Estate; and,
    - Farms Estate.

- Develop a core group of full-time and part-time commercial beef farmers to sustain a significant share of the domestic market.

- Establish a core group of full-time and part-time commercial small ruminant farmers to expand production.
- Provide villages with community grazing pastures for individual herders.

- Ensure that proper sanitation, housing and feeding is practiced for pig production taking into consideration environmental protection mainly by the construction of soak-a-way to handle wastewater.

- Establish a core group of 25 part-time commercial pig farmers each with a minimum 12-sow unit.

- Pay greater attention to the Caribbean Amblyomma Programme (CAP) in its efforts to prevent the resurgence of the Tropical Bont Tick.

- Refit and expand the Basseterre abattoir in order to ensure that it meets the projected increased demand for slaughter.